NEW MEXICO ENVIRONMENT DEPARTMENT GROUND WATER QUALITY BUREAU

UNDERGROUND INJECTION CONTROL

GENERAL DISCHARGE PERMIT

Certified Mail- Return Receipt Requested

Facility Name:	**Canyon Auto Groundwater Remediation Site**
Facility Location:	**843 NM 333, Tijeras, New Mexico** **Section 7, T 10 N, R 6 E** **Bernalillo**
Legally Responsible Party:	**New Mexico Environment Department Petroleum Storage Tank Bureau** **121 Tijeras Avenue NE, Suite 1000** **Albuquerque, NM 87102** **505-222-9561r**
Remediation Oversight Agency Contact:	**New Mexico Environment Department Petroleum Storage Tank Bureau** **Michael Leger (Project Manager)** **505-222-9561**
Remediation or Injection Plan Identification:	**"Phase 5 Remediation Workplan for Canyon Auto Source Area" (Placement of solid granular ORC-A in soil borings)**
Permitting Action:	**New DP-1901**
PPS Contact	**Tim Haller - Haller & Associates, Inc.** **505-281-9333 timhaller@vcimail.com**
EFFECTIVE DATE: XX/XX/XXXX	**TERM ENDS: XX/XX/XXXX**

Michelle Hunter
Chief, Ground Water Quality Bureau

[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]

I. UIC GENERAL DISCHARGE PERMIT

The New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) issues this Underground Injection Control General Discharge Permit (UIC Permit) for the subsurface emplacement of additive fluids through a Class V UIC injection well for the purpose of facilitating vadose zone or groundwater remediation. The GWQB issues this UIC Permit to New Mexico Environment Department – Petroleum Storage Tank Bureau (Permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Ground and Surface Water Protection Regulations, 20.6.2 NMAC.

In issuing this UIC Permit, the GWQB has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met. The activities authorized by this UIC Permit are principally governed by Phase 5_ Remediation Workplan for Canyon Auto Source Area (Injection Plan), under the authority of NMAC 20.5.119.1925 through 1929 - Corrective Action for Storage Tank Systems Containing Petroleum Products, with oversight by the Petroleum Storage Tank Bureau-Remedial Action Program. Compliance with this UIC Permit requires compliance with the terms, requirements, and conditions of the Injection Plan. The term of this UIC Permit shall be no longer than five years from the effective date of this UIC Permit.

The injection activities, the location of the injection site, the type of injection and quantities of additives being used are briefly described as follows:

Injection Activities (summary: including injection well type, number of wells, and injection frequency)

Copy of the Injection Plan Attached (required): ☒
Summary of Injection Plan: The attached workplan provides methods and specifications for drilling 28 borings to a depth of approximately 83 feet and backfilling the bottom 15 feet of each boring with granular Oxygen Release Compound-Advanced (ORC-A).

Injection Site Information

Depth to most shallow groundwater (required): 69-70 ft

Existing concentration of total dissolved solids (TDS) in groundwater (required): 872 mg/L

Location (required): Turnout/parking area adjacent to north side of NM 333, 400 feet east of Zuzax overpass

County (required): Bernalillo

Latitude: 35.106346

Longitude: -106.339359

Map Showing Area of Injection Sites Attached (required): ☒

Additives Being Used (including volumes, manufacturer, and mixing ratios)

Granular Oxygen Release Compound-Advanced™ by Regenesis.
11,075 pounds total
396 pounds per boring, total of 28 borings
Mixed with 300 pounds of silica sand per boring and placed in the bottom 15 feet of each boring Ratio of ORC granules to silica sand is approximately 1.3 to 1
ORC-A placement interval will be approximately 67 to 82 feet
Depth to groundwater is 69-70 feet

Anticipated Precipitation, Dissolution, Adsorption, and Desorption Products

Anticipated Increases: dissolved oxygen, pH, oxidation-reduction potential and alkalinity.

Anticipated Decreases: dissolved metals, BOD, COD, nitrate, sulfate, petroleum contaminants.

Anticipated Precipitants: reduced-state Fe and Mn will precipitate as solid oxides.

Similar to effects of air sparging, the hydrogeologic regime will change from anaerobic to aerobic due to sustained increase in dissolved oxygen.

End products of aerobic biodegradation of petroleum contaminants are carbon dioxide and water.

Public Notice Posting Locations

2 inch by 3 inch Newspaper Ad required for Renewal applications.
Newspaper: Not Applicable- New Application

3 inch by 4 inch Newspaper Ad required for New, Modification, and Renewal/Modification applications.
Newspaper: The Independent (Published in Edgewood; Circulated Throughout East Mountains)

2 feet by 3 feet sign posted for 30 days in a location conspicuous to the public at or near the facility required for New, Modification, and Renewal/Modification applications.
Sign Location: Attached to on-site chain link fence, facing NM 333

8.5 inch by 11 inch or larger posted off-site location conspicuous to the public (e.g. public library). Required for New, Modification, and Renewal/Modification applications.
Flyer Location: Village of Tijeras Public Library

This UIC Permit consists of the complete and accurate completion of this UIC Permit form as determined by the GWQB.
Issuance of this UIC Permit does not relieve the Permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Signatures

Signature must be that of the person listed as the legally responsible party on this application.

I, the applicant, attest under penalty of law to the truth of the information and supporting documentation contained in this application for an Underground Injection Control General Discharge Permit.

Applicant's Signature

Signature: Lorena Goerger Digitally signed by Lorena Goerger Date: 2020.06.05 07:30:48 -06'00' Date: _____

Printed Name: Lorena Goerger Title: Program Manager

II. FINDINGS

In issuing this UIC Permit, GWQB finds:

1. The Permittee is injecting fluids so that such injections will move directly or indirectly into groundwater within the meaning of Section 20.6.2.3104 NMAC.
2. The Permittee is injecting fluids so that such fluids will move into groundwater of the State of New Mexico which has an existing concentration of 10,000 mg/L or less of TDS within the meaning of Subsection A of 20.6.2.3101 NMAC.
3. The Permittee is using a Class V UIC well as described in 20.6.2.5002(B)(5)(d)(ii) NMAC for in situ groundwater remediation by injecting a fluid that facilitates vadose zone or groundwater remediation.
4. The Permittee is injecting fluids into groundwater in order to achieve the remediation goals identified in the Injection Plan.

III. AUTHORIZATION TO DISCHARGE

The Permittee is authorized to inject chemical additives into groundwater in accordance with this UIC Permit and the Injection Plan under the oversight of Petroleum Storage Tank Bureau.

[20.6.2.3104 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3109 NMAC]

IV. CONDITIONS

The conditions of this UIC Permit shall be complied with by the Permittee and are enforceable by GWQB.

1. The Permittee shall perform remediation activities in accordance with the Injection Plan and shall notify GWQB of any changes prior to making them.

   [20.6.2.3107 NMAC]

2. The Permittee shall monitor the injection activities and their effects on groundwater quality as required by the Injection Plan and shall provide GWQB with electronic copies of the required reporting and any pertinent documentation of activities at the site.

   [20.6.2.3107.A NMAC, 20.6.2.3109.A NMAC]

3. If the GWQB or the Permittee identifies any failure of the Injection Plan or this UIC Permit to comply with 20.6.2 NMAC not specifically noted herein, GWQB may require the Permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure.

   Additionally, the GWQB may require the Permittee to submit a proposed modification to the Injection Plan, this UIC Permit, or both.

   [20.6.2.3107.A NMAC, 20.6.2.3109.E NMAC]

4. TERMINATION – Within 30 days of completion of activities authorized by this UIC Permit the Permittee shall submit a closure report and a request to terminate the UIC Permit to the GWQB for its approval. The closure report shall identify how the injection well(s) was (were) closed in accordance with the Injection Plan. The Permittee shall provide Petroleum Storage Tank Bureau with a copy of this closure report.

   [20.6.2.5005 NMAC, 19.27.4 NMAC]

5. INSPECTION and ENTRY – The Permittee shall allow a representative of the NMED to inspect the facility and its operations subject to this UIC Permit and the WQCC regulations. The GWQB representative may, upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC.

   The Permittee shall allow the GWQB representative to have access to, and reproduce for their use, any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this UIC Permit and the WQCC regulations.

   Nothing in this UIC Permit shall be construed as limiting in any way the inspection and entry authority of GWQB under the WQA, the WQCC Regulations, or any other local, state, or federal regulations.

   [20.6.2.3107.D NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]

6. MODIFICATIONS and/or AMENDMENTS – In the event the Permittee proposes a change to the injection plan that would result in a change in the volume injected; the location of the injections; or the concentration of the additives being injected by the facility, the Permittee shall notify GWQB prior to implementing such changes. The Permittee shall obtain approval (which may require modification of this UIC Permit) by GWQB prior to implementing such changes.

   [20.6.2.3107.C NMAC, 20.6.2.3109.E and G NMAC]

7. COMPLIANCE with OTHER LAWS – Nothing in this UIC Permit shall be construed in any way as relieving the Permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits, or orders.

   [NMSA 1978, § 74-6-5.L]

8. PERMIT FEES – Payment of permit fees is due at the time of UIC Permit approval. Permit fees shall be paid in a single payment remitted to GWQB no later than 30 days after the UIC Permit effective date.

   Permit fees are associated with issuance of this UIC Permit. Nothing in this UIC Permit shall be construed as relieving the Permittee of the obligation to pay all permit fees assessed by GWQB. A Permittee that ceases injecting or does not commence injecting during the term of the UIC Permit shall pay all permit fees assessed by GWQB. An approved UIC Permit shall be suspended or terminated if the facility fails to remit a payment by its due date.

   [20.6.2.3114.F NMAC, NMSA 1978, § 74-6-5.K]

APPENDIX A

WORKPLAN FOR PLACEMENT OF OXYGEN RELEASE COMPOUND-ADVANCED™

Haller & Associates, Inc.
Environmental Services & Geoscience

April 10, 2019

Mr. Michael Leger
New Mexico Environment Department
Petroleum Storage Tank Bureau
121 Tijeras Avenue NE, Suite 1000
Albuquerque, NM 87102

RE: Phase 5 Remediation Workplan for Canyon Auto Source Area
Indian Hills Complex, Highway 333 East, Tijeras, New Mexico
State Lead Contract No. 18-667-3200-0023
Facility #28654 SID #611

Dear Mr. Leger:

Haller & Associates, Inc. (HAI) is pleased to submit this workplan and costs to implement in-situ aerobic treatment of dissolved-phase petroleum contaminants at the Canyon Auto source area within the Indian Hills Complex in Tijeras, New Mexico. The scope of this workplan is based on the technical approach presented in our remediation proposal for the Indian Hills Complex dated April 4, 2018.

All work within the Indian Hills Complex is subject to the provisions of Professional Services Contract #18-667-3200-0023.

If you have questions or comments, please call me at (505) 281-9333.

Sincerely,

HALLER & ASSOCIATES, INC.

Timothy M. Haller, CPG
VP / Hydrogeologist

Attachments: Canyon Auto Site Remediation Workplan

P.O. Box 1667, 12220 N Hwy 14, Suite C, Cedar Crest, NM 87008
Ph: 505-281-9333 • Fax: 505-281-9338 • License #92466

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CANYON AUTO REMEDIATION WORKPLAN
INDIAN HILLS COMPLEX
STATE HIGHWAY 333 EAST
TIJERAS, NEW MEXICO

1.0 BACKGROUND AND OBJECTIVES

A multi-phase extraction (MPE) remediation system was intermittently operated at the Canyon Auto source area from 2007 to 2013. All of the remediation equipment was moved to the Turner Branch source area in 2016. Four wells are located at the site. CAMW-8 is a monitor well. CAMW-24, CAMW-29 and CAMW-32 were formerly utilized as MPE remediation wells. All other monitor wells and injection wells at the Canyon Auto source area were plugged and abandoned in December 2018. The site location is shown on Figure 1. Site features and wells are shown on Figure 2.

Groundwater contaminant concentrations were substantially reduced by the MPE system. Measurable NAPL was eliminated from MW-8 within the first few months of soil vapor extraction operation. When the MPE system was turned off in 2013, groundwater contaminants in MPE wells CAMW-24 and CAMW-29 declined to below New Mexico Water Quality Control Commission (NMWQCC) standards and/or detection limits.

Dissolved contaminant rebound occurred after the 2013 system shutdown. During the most recent sampling event in October 2017, benzene concentrations at Canyon Auto ranged from 89 to 480 micrograms per liter (µg/L). The highest benzene concentration was detected at CAMW-24. Total naphthalenes ranged from 61 to 870 µg/L. The highest naphthalenes concentration was detected at CAMW-8. The October 2017 water level data and analytical data are summarized in Table 1.

Depth to unconfined groundwater at Canyon Auto is variable, ranging from 36 feet at CAMW-24 to an average of 70 feet at the other 3 wells. Groundwater occurs in fractured mudstone and siltstone of the Abo Formation. Groundwater flow and contaminant migration are predominantly to the west, coincident with topography. Local variations occur due to geologic structure and seasonal stormwater flow in nearby Tijeras Arroyo.

The remedial strategy is distribution of granular ORC Advanced® (ORC-A) in a grid of borings from CAMW-8 to CAMW-24. This workplan includes the following tasks:

- Discharge permit application for in-situ treatment of dissolved contaminants
- Utility permit application and traffic control permit application for right-of-way work
- Borings permit and plugging plan for 28 ORC-A backfill borings
- In-situ aquifer treatment using granular ORC-A as backfill in the saturated zone in 28 borings located in the contaminant source area (Figure 3).
- Preparation of associated reports

1.1 Baseline and Quarterly Groundwater Monitoring

Baseline groundwater monitoring will be performed prior to implementation of the remedial strategy. Quarterly groundwater monitoring will be performed to assess changes in dissolved oxygen (DO), oxidation-reduction potential (ORP) and dissolved petroleum contaminant concentrations after placement of ORC-A. Baseline and quarterly monitoring are addressed in the Turner Branch workplan dated March 6, 2019. The groundwater monitoring regimen in that workplan includes monitor wells at both Canyon Auto and Turner Branch. Therefore, the scope and costs of groundwater monitoring are not part of this workplan.

2.0 DISCHARGE PERMIT APPLICATION AND PUBLIC NOTICE

HAI will prepare an application for an Underground Injection Control (UIC) General Discharge Permit in accordance with 20.6.2.5006 NMAC. The application will be prepared using forms issued by the NMED Ground Water Quality Bureau (GWQB) Pollution Prevention Section. The permit application will include the oxidant injection plan and groundwater monitoring plan. The permit application will be submitted with payment of a $100.00 application fee and a $600.00 general permit fee.

Four forms of public notice of the permit application will be completed:

- Publish a 3-inch by 4-inch display ad in the local East Mountain newspaper (The Independent)
- Post a 2-foot by 3-foot laminated sign for 30 days in a conspicuous location at the site
- Post an 8.5-inch by 11-inch or larger flyer at the Tijeras public library
- Mail 8.5-inch by 11-inch flyers to the site owner and owners of property within ⅓-mile of the site

The UIC General Discharge Permit application forms are presented in Appendix A.

3.0 EXPLORATORY BORINGS PERMIT

Twenty-eight (28) soil borings will be drilled. All of the borings will penetrate more than 5 feet below the water table. Therefore, a permit to drill exploratory borings will be required by the New Mexico Office of the State Engineer (NMOSE). A plugging plan will also be required. HAI will prepare the borings permit application using NMOSE Form #WR-07. The permit application will be accompanied by a plugging plan prepared using NMOSE plugging plan forms. The permit application and plugging plan will be submitted in triplicate to NMOSE. PDF copies will be provided to NMED via email. Drilling will not commence until the permit approval is received from NMOSE.

4.0 UTILITY PERMIT

All of the ORC-A borings will be located on New Mexico Department of Transportation (NMDOT) right-of-way. Therefore, HAI will obtain a utility permit from the NMDOT District 3 for authorization to drill the borings. The permit application will be prepared using standard forms provided by NMDOT. The permit application will include a site plan showing boring locations and a conceptual profile of the borings. The permit application will also include a traffic control plan prepared by Southwest Safety Services, Inc. A copy of the approved utility permit will be provided to PSTB via email.

5.0 TRAFFIC CONTROL PERMIT

After the utility permit is approved, HAI will submit a traffic control permit application to NMDOT District 3. The permit application will be prepared using standard forms provided by NMDOT. The permit application will include the traffic control plan prepared by Southwest Safety Services, Inc. Implementation of the traffic control plan (placement of signs and barricades) will be performed by Southwest Safety Services, Inc. A copy of the approved traffic control permit will be provided to PSTB via email.

6.0 ORC-A BACKFILL BORINGS

Aquifer treatment using ORC-Advanced (ORC-A) is proposed for Canyon Auto. The strategy is to emplace 15 linear feet of ORC-A within the capillary fringe and the top of the saturated zone (67 to 82 feet bgs) using a grid of 28 soil borings. In the vicinity of CAMW-24, ORC-A placement will begin at the depth at which groundwater is encountered and end at a depth of approximately 83 feet. This is to adjust for the shallower water levels that are present at CAMW-24.

ORC-A will be placed in the shallow aquifer using the "boring backfill" method. The aquifer matrix at Canyon Auto is predominantly fractured mudstone and siltstone with sandstone and shale interbeds. Therefore, direct-push injection is not technically feasible. Injection wells are not cost-effective due to their proclivity to rapidly clog up during the first injection event. Therefore, Regenesis prescribes the "boring backfill" method for placement of granular ORC-A into consolidated rock formations and low permeability unconsolidated alluvium formations.

A total of 11,075 pounds of ORC-A (≈396 pounds per boring) will be utilized for dissolved petroleum contaminant treatment at the Canyon Auto source area. The ORC-A will be unloaded and stored inside the existing chainlink fence enclosure. HAI will provide a 2-man team to meet the truck, unload the ORC-A (201 sacks) and stage it inside the fenced compound area. The gates will be locked when the site is unattended.

The ORC-A backfill will provide continuous release of dissolved oxygen into the groundwater plume for up to 12 months. The proposed layout of 28 ORC-A backfill borings is shown on Figure 3. A conceptual profile of an ORC-A backfill boring is shown on Figure 4.

6.1 Site-Specific Health and Safety Plan

HAI will prepare a site-specific health and safety plan (HASP) that includes emergency contact information and hospital directions. The HASP will identify physical and chemical hazards associated with the remedial approach. Physical hazards will consist of the hazards typically associated with drilling. Chemical hazards will consist of exposure to petroleum contaminants and ORC-A through the inhalation and dermal contact pathways. The HASP will include a material safety data sheet for ORC-A and the personnel protection equipment required to minimize exposure. The HASP will be reviewed and signed by all field personnel. HAI will conduct daily tailgate safety meetings to review safety procedures and hospital directions.

6.2 Notifications and Utilities

HAI will notify the PSTB and NMDOT at least 10 days prior to commencement of fieldwork. Notifications will be provided via email. HAI will contact the New Mexico One-Call System at least 48 hours prior to drilling to locate and mark underground utilities.

6.3 Pre-Drilling Water Level Measurements

Static water levels will be gauged in all 4 monitor wells prior start of drilling and ORC-A backfilling. Water levels will be gauged using an electronic water level indicator. Water levels will be gauged relative to the well casings and ground level. The objective of measuring water levels relative to ground level is to determine the depths at which ORC-A will be placed in the borings, relative to ground level.

6.4 Drilling Methodology

The ORC-A backfill borings will be drilled using air-rotary methods. Although auger drilling is feasible in the soft mudstone/siltstone formation, air-rotary will result in less borehole smear which could inhibit dispersion of DO from the ORC-A into the groundwater and aquifer matrix. Drilling will be performed by Rodgers Environmental Services, Inc. using a Gefco 30K drill rig with a 10-inch diameter tri-cone bit. The borings will be uncased/open-hole, which HAI has previously performed at the site. The borings will be drilled to a total depth of 83 feet below ground surface (bgs).

An HAI field geologist will supervise drilling. Drill cuttings will be examined for lithology, moisture content and odor at 5-foot depth intervals. Drill cuttings will be field-tested for organic vapors at 5-foot intervals with a photoionization detector (heated headspace method). Field-test results will be recorded on the field boring logs.

Clean drill cuttings (<10 parts per million headspace vapors) will be segregated for later use as backfill. Contaminated drill cuttings (>10 parts per million headspace vapors) will be stockpiled on visqueen liner for waste profile sampling and potential off-site disposal.

Depth to groundwater in wells CAMW-8, CAMW-29 and CAMW-32 ranged from 68.37 to 71.64 feet below casing in October 2017. However, depth to groundwater in well CAMW-24 was approximately 36 feet bgs in October 2017. Therefore, very close attention will be given to drill cuttings moisture content and other indications of shallower groundwater zones during drilling of the borings near CAMW-24.

6.5 ORC-A Boring Backfill Methodology

Granular ORC-A (3 to 10 millimeter grain size) will be placed in the borings via tremie pipe or conductor pipe. Fifteen linear feet of ORC-A granules and similarly sized coarse silica sand (8/12 sieve size) will be simultaneously emplaced within each boring.

ORC-A Placement Depth – ORC-A backfill will be placed in most of the borings at a target depth interval of 67 to 82 feet bgs in the vicinity of CAMW-8, CAMW-29 and CAMW-32. However, ORC-A backfill will be placed in the borings near CAMW-24 beginning where shallow water is first observed, to a depth of 82 feet. Depth to groundwater in CAMW-24 was gauged at approximately 36 feet bgs in October 2017.

ORC-A Placement Volume – The volume within 15 linear feet of 10-inch diameter borehole is approximately 8.2 cubic feet. The backfill placed within the target depth interval will consist of 396 pounds (approximately 4.8 cubic feet) of ORC-A granules mixed with approximately 3.4 cubic feet of 8/12 silica sand. The ratio of ORC-A to silica sand is approximately 1.4 to 1. Approximately 10 gallons of clean water will be poured onto the ORC-A/sand backfill to settle the material prior to placement of a bentonite seal.

Bentonite Seal - One linear foot of bentonite pellets will be placed above the ORC-A backfill and hydrated with a minimum of 5 gallons of clean water.

Drill Cuttings Backfill – Clean drill cuttings (<10 ppm headspace vapor) will be placed above the bentonite seal to a depth of 20 feet bgs.

Cement Grout Seal – The last 20 feet of each boring will be grouted with Portland neat cement consisting of approximately 6 gallons of water per 94 pounds of cement.

Surface Restoration and Boring Markers – The top 3 inches of each boring will be filled with wheel-rolled cold patch asphalt. Survey spikes will be driven into each asphalt patch to permanently mark the ORC-A backfill borings.

The conceptual backfill boring profile is shown on Figure 4.

6.6 Drill Cuttings Management

As described in Section 6.5, clean drill cuttings will be reused as backfill between the bentonite seals and the cement grout seals. Any unused clean drill cuttings will be spread and leveled in the unpaved area approximately 90 to 100 feet northeast of CAMW-8 and CAMW-29. This area was formerly occupied by injection wells IW-1, IW-2 and IW-3.

Drill cuttings containing >10 parts per million of headspace vapors will be temporarily stockpiled on visqueen in the asphalt paved area approximately 60 feet northeast of CAMW-8 and CAMW-29. A composite sample will be collected from the stockpile for waste profile purposes. The waste profile sample will be field-preserved using the methanol extraction procedure. The sample will be labeled, placed in a cooler with ice, and delivered to Hall Environmental Analysis Laboratory with chain-of-custody records. The waste profile sample will be analyzed for the following:

- Volatile organic compounds (VOCs) – EPA Method 8260B
- Total petroleum hydrocarbons-gasoline (TPH-gas) – EPA Method 8015B
- Total lead (Pb) – EPA Method 6010B

If the waste profile results exceed NMED Tier 1 soil screening levels, HAI will submit a request for change order that includes costs for loading, transport and disposal of contaminated drill cuttings at a permitted landfarm facility.

If the waste profile results are below NMED Tier 1 soil screening levels for industrial land use, HAI will spread and level the drill cuttings stockpile in the same area where the unused clean cuttings were placed (Section 6.4).

6.7 ORC-A Implementation Report

HAI will prepare a report summarizing permits, ORC-A purchase and shipping, drilling, ORC-A backfill placement, and surface restoration. The report will describe field methods, field observations, dates and duration of fieldwork, ORC-A placement volumes and depths, disposition of clean drill cuttings, traffic control measures and workplan deviations, if applicable.

Pre-drilling water levels and DO/ORP will be summarized in a data table. As-built details of boring backfill materials and depths will be summarized in a data table. Appendices will include field notes, LogPlot® boring logs, photographs, ORC Advanced® purchase and shipping documentation and the waste profile laboratory report. The report will be prepared by Tim Haller, and reviewed and stamped by the engineer-of-record, Vener Mustafin, PE.

7.0 SEQUENCE OF EVENTS

The proposed sequence of events is summarized below:

1. Discharge Permit Application and Public Notice – The permit application will be submitted to GWQB and PSTB approximately 6 weeks after workplan approval. Proof of completion of public notice will be submitted 8 to 10 weeks after workplan approval.

2. Utility Permit Application and Traffic Control Permit Application – These permit applications will be completed approximately 6 weeks after workplan approval.

3. Exploratory Borings Permit Application and Plugging Plan – These documents will be completed approximately 6 weeks after workplan approval.

4. ORC-A Purchase and Delivery – HAI will order the ORC-A after all of the permits have been approved by GWQB, NMDOT and NMOSE. Regenesis estimates that the ORC-A will be delivered within two weeks of placement of the order.

5. Drilling and ORC-A Placement – Drilling will commence approximately 1 to 2 weeks after delivery of ORC-A. This is contingent upon drilling rig availability and weather conditions. Rodgers has estimated that drilling, ORC-A backfilling, grouting and surface restoration will be complete in 45 days.

6. ORC-A Remedial Implementation Report – The final and complete report of remedial implementation will be submitted to PSTB approximately 4 weeks after completion of all fieldwork in Task 5 above.

This conceptual schedule is subject to the following:

- Timely approval of permits by GWQB, NMDOT and NMOSE
- No major weather-related delays or drill rig breakdown
- Groundwater monitoring will be performed in accordance with the Turner Branch remedial implementation workplan dated March 6, 2019

8.0 DELIVERABLES AND COSTS

8.1 GWQB Discharge Permit Application and Public Notice

Preparation of the discharge permit application and completion of public notice will be completed for a Fixed Fee of $3,618.88, including NMGRT. Additional fees will consist of the $100.00 application fee and the $600.00 general permit fee (both non-taxable).

8.2 NMDOT Utility Permit and Traffic Control Permit Applications

Preparation of the utility permit application and traffic control permit application will be completed for a Fixed Fee of $2,040.94, including NMGRT.

8.3 NMOSE Borings Permit Application and Plugging Plan

Preparation of the exploratory borings permit and plugging plan will be completed for a Fixed Fee of $1,852.01, including NMGRT. A permit fee of $5.00 per boring will result in a total permit application fee of $140.00 (non-taxable).

8.4 ORC-Advanced® Purchase, Shipping and Unloading

Purchase, handling and shipping of 11,075 pounds of granular ORC-A will be completed for a Fixed Fee of $101,549.14, including NMGRT.

HAI will provide two-person labor to unload and stage the ORC-A and prepare a letter report with photographs and shipping documents to substantiate ORC-A delivery for a Fixed Fee of $1,607.21, including NMGRT.

8.5 Drilling, ORC-A Backfilling and Traffic Control

Drilling and completion of 28 ORC-A backfill borings, HAI oversight, clean drill cuttings management and traffic control measures will be completed as described herein for a Fixed Fee of $207,025.46, including NMGRT. HAI will submit a letter report with photographs and the field boring logs.

8.6 Remedial Implementation Report

HAI will complete the ORC-A remedial implementation report for a Fixed Fee of $6,019.04, including NMGRT. The report will be prepared in accordance with Section 6.7 of this workplan.

8.7 Contingency Set-Aside Funds

HAI requests a contingency set aside budget of $5,000.00, including NMGRT to cover unknown or unanticipated field conditions, variation between estimated and actual shipping costs or other out-of-scope circumstances. HAI will submit written requests for release of funds, including description and justification of request for funds. Contingency work will not be performed without prior written authorization from PSTB.

8.8 Total Workplan Cost

The full scope of this workplan will be completed for a Total Cost of $329,552.68, including 6.4375% NMGRT and non-taxable expenses.

The costs quoted herein will not be exceeded without prior written authorization from the PSTB. This project will be subject to the provisions of Indian Hills Complex Professional Services Contract #18-667-3200-0023 and the PSTB Contractor Fee Schedule effective December 27, 2018.

The Regenesis ORC-Advanced® Application Design Summary and the Rodgers drilling quote are presented in Appendix B.

Cost Detail Forms are presented in Appendix C.

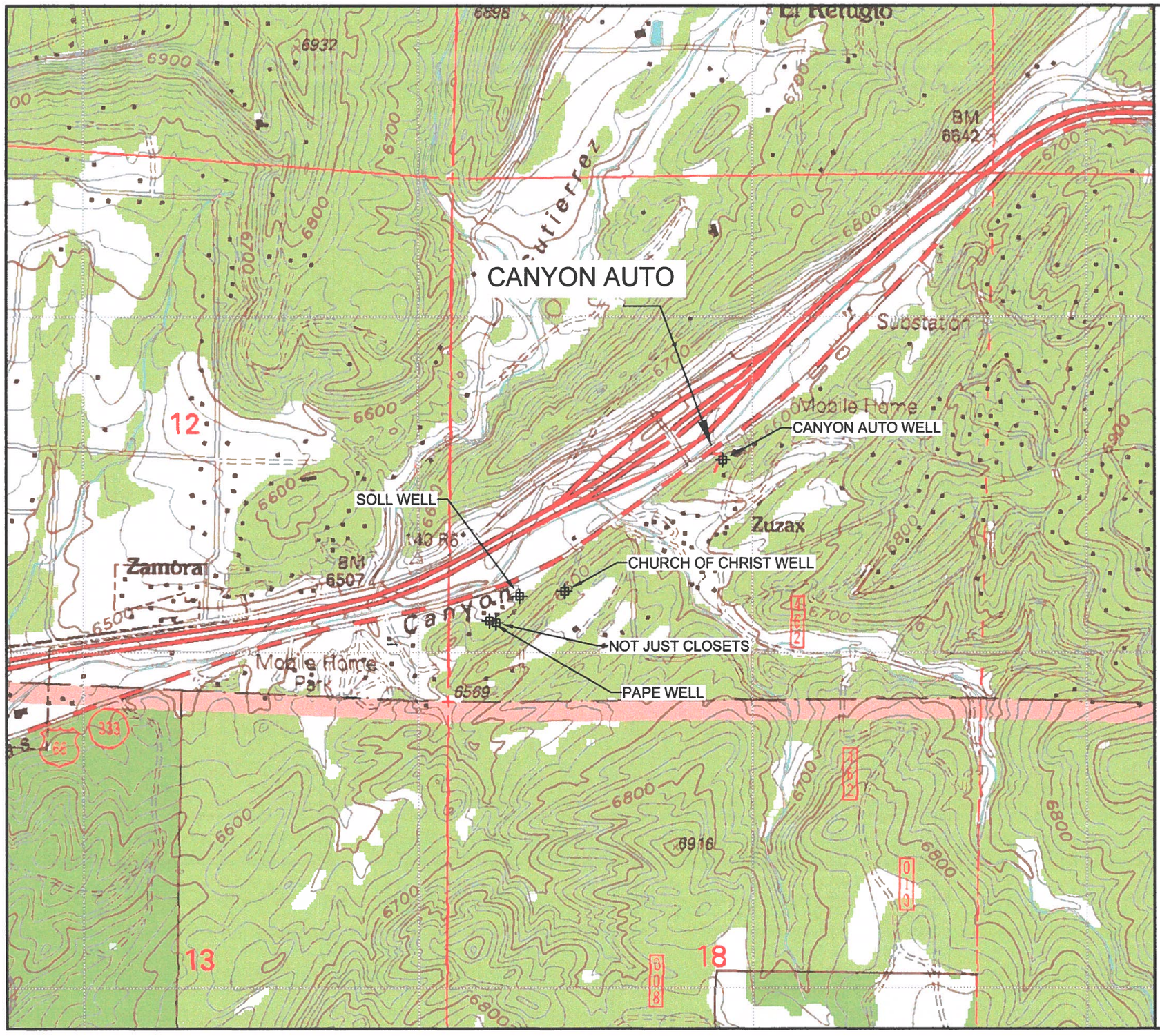
TABLES

TABLE 1. SUMMARY OF GROUNDWATER DATA - OCTOBER 2017
CANYON AUTO SOURCE AREA
INDIAN HILLS COMPLEX, TIJERAS, NEW MEXICO

Well ID	Screen Interval (ft bgs)	Depth to Groundwater (ft btoc)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Naphthalenes (µg/L)	MTBE (µg/L)	DO (ppm)	ORP (mV)
CAMW-8	54 - 74	68.37	**89**	39	400	**620**	**870**	<20	2.26	167
CAMW-24	54 - 84	30.62*	**480**	<5.0	240	41	**61**	12	2.51	169
CAMW-29	51 - 81	71.64	**120**	16	320	79	**80**	11	2.51	170
CAMW-32	55 - 87	70.39	**120**	42	290	450	**141**	12	2.70	169
NMWQCC Standard	**N/A**	**N/A**	**5**	**1,000**	**700**	**620**	**30**	**100**	**N/A**	**N/A**

NOTES:
* Well casing is approximately 5 feet bgs; therefore, depth to water is approximately 35.62 feet bgs.
ft bgs = feet below ground surface
ft btoc = feet below top of casing
DO = dissolved oxygen
MTBE = methyl-tertiary-butyl ether
mV = millivolts
NMWQCC = New Mexico Water Quality Control Commission
ORP = oxidation-reduction potential
ppm = parts per million
Concentrations shown in bold type exceed standards.

FIGURES



NOTES:

PRIVATE WATER SUPPLY WELLS

SURFACE WATER RECEPTORS INCLUDED THE TIJERAS ARROYO THAT IS LOCATED TO THE NORTH OF THE SITE.

1000 500 0 1000

REVISIONS

REV	DATE	DRAWN	CHECKED	REMARKS

Haller & Associates, Inc.
Environmental Services & Geoscience

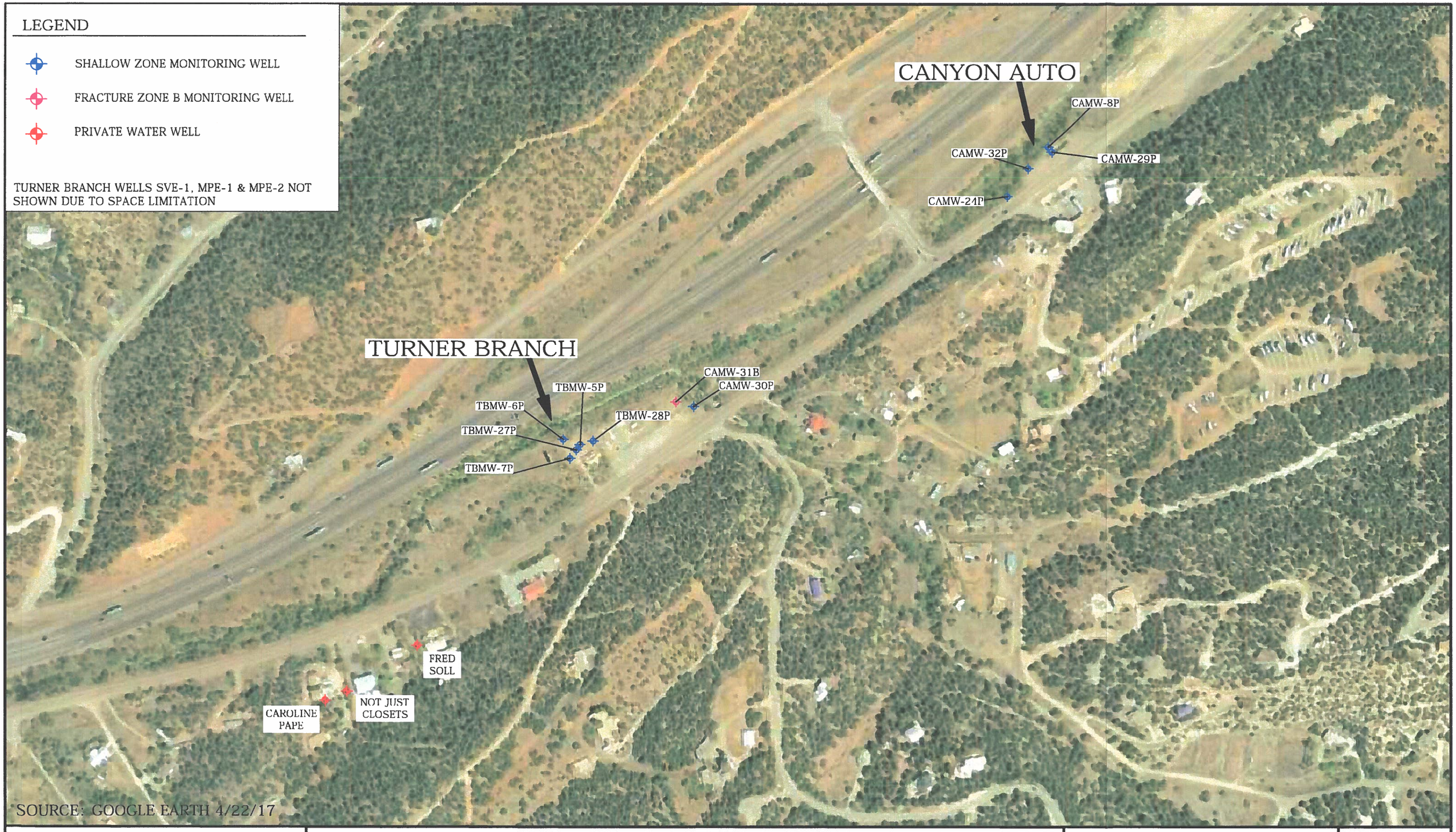
DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____

INDIAN HILLS COMPLEX
HIGHWAY 333, TIJERAS, NEW MEXICO

SITE LOCATION MAP

PROJECT NUMBER:
6230804

DRAWING NO.:
FIGURE 1



Haller & Associates, Inc.
Environmental Services & Geoscience
P.O. BOX 1667, 12220 N. HWY 14, SUITE C
CEDAR CREST, NEW MEXICO 87008

SITE MAP

INDIAN HILLS COMPLEX
HIGHWAY 333
TIJERAS, NEW MEXICO

0 300
SCALE IN FEET
N

FIGURE
2

Haller & Associates, Inc.
Environmental Services & Geoscience
P.O. BOX 1667, 12220 N. HWY 14, SUITE C
CEDAR CREST, NEW MEXICO 87008

CANYON AUTO ORC-A BACKFILL BORINGS

INDIAN HILLS COMPLEX
HIGHWAY 333
TIJERAS, NEW MEXICO

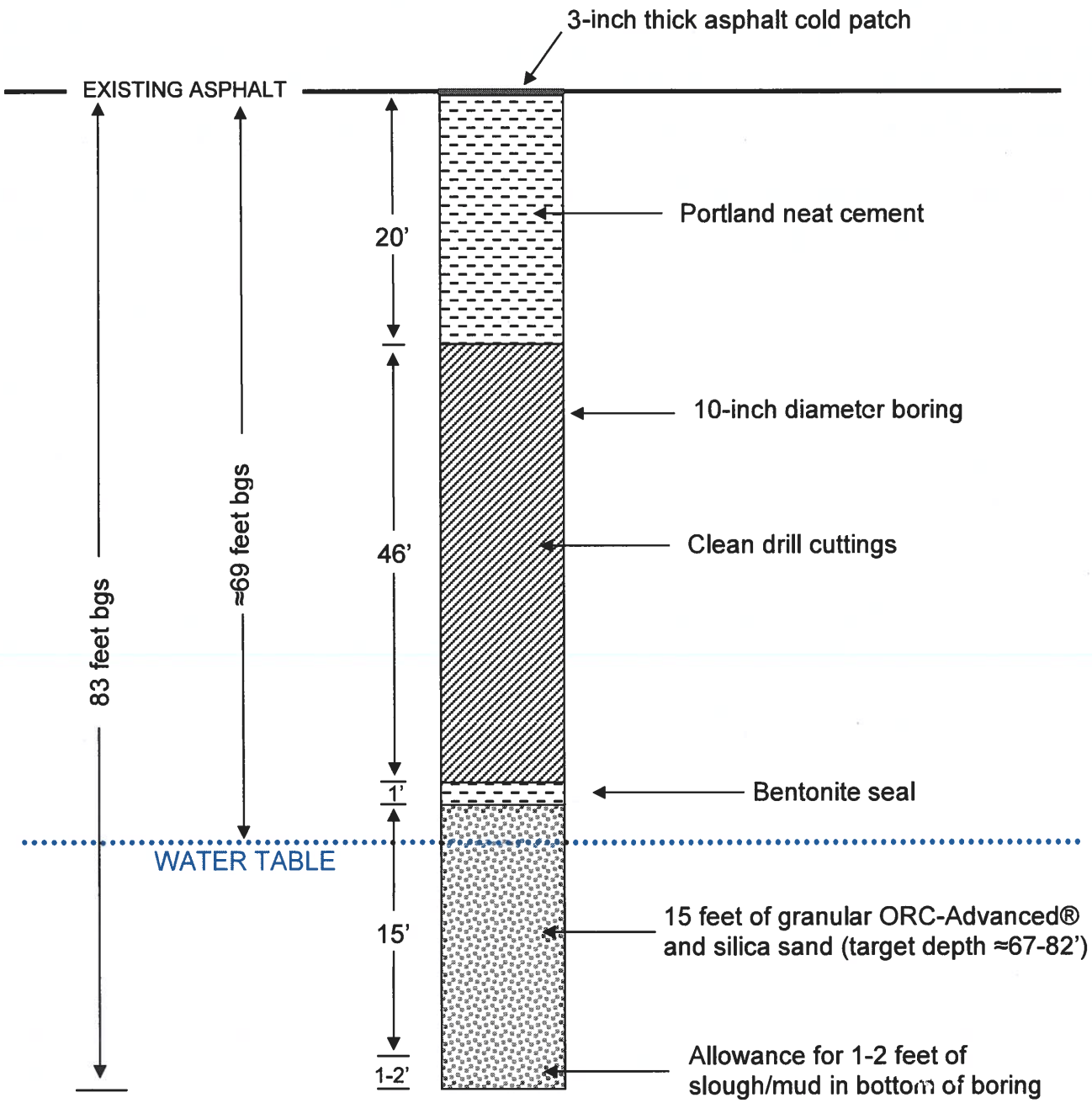
0 30
SCALE IN FEET

N

FIGURE
3

Figure 4. ORC-A Boring Profile

Canyon Auto Source Area, Tijeras, New Mexico



Note – Depth to groundwater in wells CAMW-8, CAM-29 and CAMW-32 ranged from 68.4 to 71.6 feet in October 2017. Depth to groundwater in CAMW-24 was 36 feet bgs.

APPENDIX A

UIC CLASS V GENERAL DISCHARGE PERMIT APPLICATION FORM

NEW MEXICO ENVIRONMENT DEPARTMENT
GROUND WATER QUALITY BUREAU

UNDERGROUND INJECTION CONTROL

GENERAL DISCHARGE PERMIT

Certified Mail- Return Receipt Requested

Facility Name:	**[FACILITY NAME]**
Facility Location:	**Physical Address** **Section, Township, Range** **County**
Legally Responsible Party:	**[LEGALLY RESPONSIBLE PARTY]** **Physical Address** **Phone Number**
Remediation Oversight Agency Contact:	**[NAME OF NMED BUREAU OR SECTION]** **Contact Name** **Phone Number**
Remediation or Injection Plan Identification:	**[INJECTION PLAN IDENTIFICATION]**
Permitting Action:	**New/Renewal/Modification/Renewal and Modification**
PPS Contact	**Contact Name** **Phone Number**
EFFECTIVE DATE: XX/XX/XXX	**TERM ENDS: XX/XX/XXXX**

Michelle Hunter
Chief, Ground Water Quality Bureau

[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]

Version updated December 5, 2018

I. UIC GENERAL DISCHARGE PERMIT

The New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) issues this Underground Injection Control General Discharge Permit (UIC Permit) for the subsurface emplacement of additive fluids through a Class V UIC injection well for the purpose of facilitating vadose zone or groundwater remediation. The GWQB issues this UIC Permit to [LEGALLY RESPONSIBLE PARTY] (Permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Ground and Surface Water Protection Regulations, 20.6.2 NMAC.

In issuing this UIC Permit, the GWQB has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met. The activities authorized by this UIC Permit are principally governed by [INJECTION PLAN IDENTIFICATION] (Injection Plan), under the authority of [STATUTES/REGULATIONS], with oversight by the [NAME OF NMED BUREAU OR SECTION]. Compliance with this UIC Permit requires compliance with the terms, requirements, and conditions of the Injection Plan. The term of this UIC Permit shall be no longer than five years from the effective date of this UIC Permit.

The injection activities, the location of the injection site, the type of injection and quantities of additives being used are briefly described as follows:

Injection Activities (summary: including injection well type, number of wells, and injection frequency)

Copy of the Injection Plan Attached (required): ☐

Injection Site Information

Depth to groundwater: XXX ft
Existing concentration of total dissolved solids (TDS) in groundwater: X,XXX mg/L
Location: Description of site location
County: County
Latitude: Latitude
Longitude: Longitude

Map Showing Area of Injection Sites Attached (required) -: ☐

Additives Being Used (including volumes, manufacturer, and mixing ratios)

Anticipated Precipitation, Dissolution, Adsorption, and Desorption Products

Public Notice Posting Locations

2 inch by 3 inch Newspaper Ad required for Renewal applications.
Newspaper: Selected Newspaper

3 inch by 4 inch Newspaper Ad required for New, Modification, and Renewal/Modification applications.
Newspaper: Selected Newspaper

2 feet by 3 feet sign posted for 30 days in a location conspicuous to the public at or near the facility required for New, Modification, and Renewal/Modification applications.
Sign Location: Selected Location

8.5 inch by 11 inch or larger posted off-site location conspicuous to the public (e.g. public library). Required for New, Modification, and Renewal/Modification applications.
Flyer Location: Selected Location

This UIC Permit consists of the complete and accurate completion of this UIC Permit form as determined by the GWQB.
Issuance of this UIC Permit does not relieve the Permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Signatures

Signature must be that of the person listed as the legally responsible party on this application.

I, the applicant, attest under penalty of law to the truth of the information and supporting documentation contained in this application for an Underground Injection Control General Discharge Permit.

Applicant's Signature

Signature: _____ Date: _____

Printed Name: _____ Title: _____

II. FINDINGS

In issuing this UIC Permit, GWQB finds:

1. The Permittee is injecting fluids so that such injections will move directly or indirectly into groundwater within the meaning of Section 20.6.2.3104 NMAC.
2. The Permittee is injecting fluids so that such fluids will move into groundwater of the State of New Mexico which has an existing concentration of 10,000 mg/L or less of TDS within the meaning of Subsection A of 20.6.2.3101 NMAC.
3. The Permittee is using a Class V UIC well as described in 20.6.2.5002(B)(5)(d)(ii) NMAC for in situ groundwater remediation by injecting a fluid that facilitates vadose zone or groundwater remediation.
4. The Permittee is injecting fluids into groundwater in order to achieve the remediation goals identified in the Injection Plan.

III. AUTHORIZATION TO DISCHARGE

The Permittee is authorized to inject chemical additives into groundwater in accordance with this UIC Permit and the Injection Plan under the oversight of [NAME OF NMED BUREAU OR SECTION].

[20.6.2.3104 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3109 NMAC]

IV. CONDITIONS

The conditions of this UIC Permit shall be complied with by the Permittee and are enforceable by GWQB.

1. The Permittee shall perform remediation activities in accordance with the Injection Plan and shall notify GWQB of any changes prior to making them.

   [20.6.2.3107 NMAC]

2. The Permittee shall monitor the injection activities and their effects on groundwater quality as required by the Injection Plan and shall provide GWQB with electronic copies of the required reporting and any pertinent documentation of activities at the site.

   [20.6.2.3107.A NMAC, 20.6.2.3109.A NMAC]

3. If the GWQB or the Permittee identifies any failure of the Injection Plan or this UIC Permit to comply with 20.6.2 NMAC not specifically noted herein, GWQB may require the Permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure.

   Additionally, the GWQB may require the Permittee to submit a proposed modification to the Injection Plan, this UIC Permit, or both.

   [20.6.2.3107.A NMAC, 20.6.2.3109.E NMAC]

4. ADDITIONAL MONITORING REQUIREMENTS – (RESERVED) - Placeholder for any added monitoring and reporting requirements.

5. TERMINATION – Within 30 days of completion of activities authorized by this UIC Permit the Permittee shall submit a closure report and a request to terminate the UIC Permit to the GWQB for its approval. The closure report shall identify how the injection well(s) was (were) closed in accordance with the Injection Plan. The Permittee shall provide [NAME OF NMED BUREAU OR SECTION] with a copy of this closure report.

   [20.6.2.5005 NMAC, 19.27.4 NMAC]

6. INSPECTION and ENTRY – The Permittee shall allow a representative of the NMED to inspect the facility and its operations subject to this UIC Permit and the WQCC regulations. The GWQB representative may, upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC.

   The Permittee shall allow the GWQB representative to have access to, and reproduce for their use, any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this UIC Permit and the WQCC regulations.

   Nothing in this UIC Permit shall be construed as limiting in any way the inspection and entry authority of GWQB under the WQA, the WQCC Regulations, or any other local, state, or federal regulations.

   [20.6.2.3107.D NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]

7. MODIFICATIONS and/or AMENDMENTS – In the event the Permittee proposes a change to the injection plan that would result in a change in the volume injected; the location of the injections; or the concentration of the additives being injected by the facility, the Permittee shall

notify GWQB prior to implementing such changes. The Permittee shall obtain approval (which may require modification of this UIC Permit) by GWQB prior to implementing such changes.

[20.6.2.3107.C NMAC, 20.6.2.3109.E and G NMAC]

8. COMPLIANCE with OTHER LAWS – Nothing in this UIC Permit shall be construed in any way as relieving the Permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits, or orders.

   [NMSA 1978, § 74-6-5.L]

9. PERMIT FEES – Payment of permit fees is due at the time of UIC Permit approval. Permit fees shall be paid in a single payment remitted to GWQB no later than 30 days after the UIC Permit effective date.

   Permit fees are associated with issuance of this UIC Permit. Nothing in this UIC Permit shall be construed as relieving the Permittee of the obligation to pay all permit fees assessed by GWQB. A Permittee that ceases injecting or does not commence injecting during the term of the UIC Permit shall pay all permit fees assessed by GWQB. An approved UIC Permit shall be suspended or terminated if the facility fails to remit a payment by its due date.

   [20.6.2.3114.F NMAC, NMSA 1978, § 74-6-5.K]

APPENDIX B

REGENESIS ORC-A DESIGN AND QUOTE
RODGERS DRILLING QUOTE

REGENESIS

Proposal for Site Remedy

To: Tim Haller w/ Haller & Associates **Date:** April 19, 2018

From: Brittain Griffiths
bgriffiths@regenesis.com 916.740.3411

Subject: ***Preliminary Design and Cost Estimate Proposal***

Site: *Canyon Auto Source Area*
Proposal No. BRG60719

Treatment Unit: Dissolved Plume

Applicable Product(s)	**Link to View/Download Product Information**
ORC Advanced Pellets	ORC Advanced Pellets

Technical and Cost Summary

The following is a preliminary remedial design for the above-referenced site. Based on the site data provided, the preliminary design and cost estimate includes the use of Oxygen Release Compound Advanced® (ORC Advanced) to treat chlorinated solvents/residual petroleum hydrocarbons. The treatment area is shown on the attached treatment map with text boxes summarizing relevant information for the remedial design. Design assumptions and technical specifications regarding the proposed design are contained on the attached tables behind the map. The following table provides a summary of pertinent information pertaining to the treatment areas, basic design elements and product cost.

Treatment Unit	Treatment Surface Area (sq ft)	Treatment Thickness (ft)	Cubic Yards (cy)	Technology	Number of Boreholes 10" diameter	Product Quantity (lbs)	Injection Volume (gals)	Product Cost*
Dissolved Plume	7,000	15	3,889	ORC Advanced	28	11,075.10	n/a	$92,477.10
				Project Totals	***28***			***$92,477.10***

***Tax and freight charges are estimated. Please contact Customer Service Department at 949-366-8000 for a shipping quote.**

Product Description and Use Rationale

Petroleum hydrocarbon plumes are typically depleted in oxygen, which limits the ability of naturally occurring microorganisms to degrade petroleum hydrocarbons. ORC Advanced supplies a controlled release of oxygen for 9-12 months in the target treatment zone to create and support the geochemical environment necessary for aerobic biodegradation of contaminants. This preliminary technical design and cost estimate contains information related to the design, application, and performance monitoring of ORC Advanced. Use the above hyperlink to access more information about ORC Advanced.

Conceptual Model and Treatment Area Technical Considerations

In generating this design proposal Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site. The attached design summary tables specify the assumptions used in preparation of this technical design. We request that these modeling input assumptions be verified by your firm prior to application.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the Government.

REGENESIS

Twenty eight 10" diameter boreholes should be used to apply the product. The boreholes should be dug to a depth of 85 feet and filled with ORC-A Pellet from 70 to 85 feet bgs. Three hundred and ninety six pounds of ORC-Advanced Pellets should be mixed with 300 lbs of silica sand. This should be poured into the borehole. After the ORC-A Pellets/Sand mixture is placed in the borehole 20 to 30 gallons of water should be poured one top of it. Once this is complete add another two hundred pounds of sand to the borehole and grout. Although these holes have been placed 10 feet on center within rows and 25 feet on center between rows one borehole should be located 3 to 5 feet immediately upgradient of any key monitoring well.

Given the complexities associated with applications, it is recommended that a contractor with proven experience mixing and injecting the remediation products proposed for this project. As part of the selection process, it is suggested to question the application contractor on the following:

- Specific experience injecting the reagent proposed
- of the appropriate injection pump (type, pressure rating, flow rate, etc.)
- Use of in-line flow meters and pressure gauges
- In-line safety values for bleeding high pressure from injection lines
- Injection tooling for bottom up or top down application
- Other project specific tooling (i.e. air compressor)
- Distribution monitoring during injection

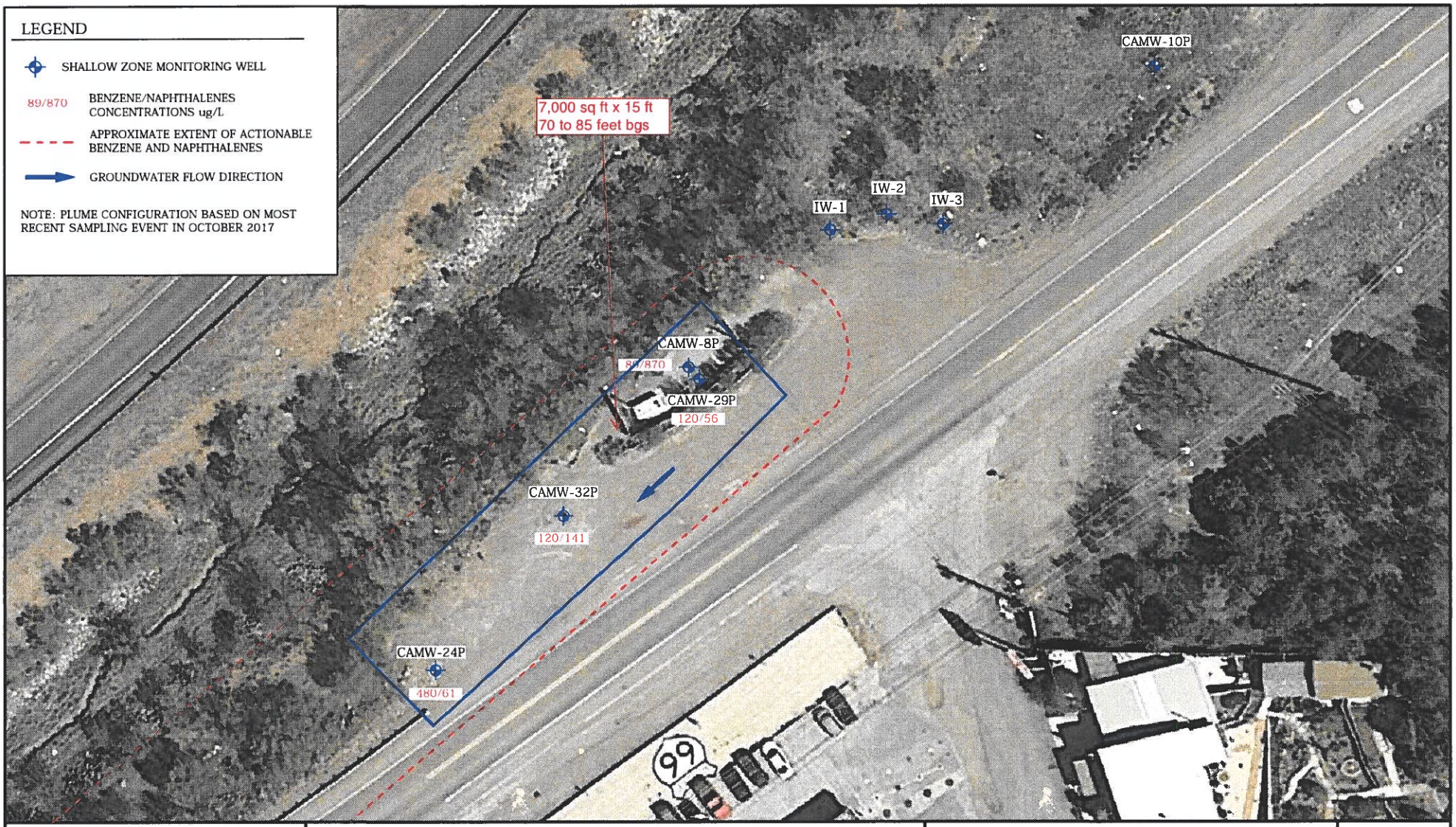
The contractor should provide a detailed log of field activities for the application process. This information is critical to the post-injection assessment of remediation performance across the site.

Performance Monitoring

We recommend groundwater samples be collected from select performance monitoring wells to evaluate enhanced natural attenuation processes. Ideally, wells from within and outside of the treatment area (i.e., upgradient and downgradient of the plume) should be sampled. A round of sampling should be conducted prior to treatment with ORC Advanced to evaluate the baseline aquifer conditions and to assess the total demand for oxygen in the treatment area. After ORC Advanced has been installed into the subsurface, groundwater samples should be collected on a quarterly, or more frequent, basis. We recommend samples be collected using low-flow methods and be analyzed for field redox parameters (pH, Temp, DO, ORP, turbidity). Additionally, submit samples to a qualified laboratory for analysis of: chemicals of concern, total dissolved Fe and Mn, COD, BOD (5 day) and methane. If practical, analyze some soil samples from the proposed treatment areas just below the water table for the contaminants of concern. This is useful in estimating the amount of hydrocarbon contamination that can continue to partition from the soil to the dissolved phase.

Closing

Please feel free to contact me if you need additional information or have any questions regarding our evaluation and/or this correspondence (contact info provided above). I will be following up with you in the near future regarding this proposal. We appreciate the opportunity and thank you for considering Regenesis as your remedial solution provider for this project.



Haller & Associates, Inc.
Environmental Services & Geoscience

P.O. BOX 1667, 12220 N. HWY 14, SUITE C
CEDAR CREST, NEW MEXICO 87008

CANYON AUTO GROUNDWATER PLUME

HIGHWAY 333
I-40 EXIT
TIJERAS, NEW MEXICO

0 Distance 30
SCALE IN FEET

IMAGE SOURCE: GOOGLE EARTH 04-22-2017

FIGURE
4

REGENESIS

ORC Advanced® Application Design Summary

Canyon Auto

Dissolved Plume		Field App Instructions
Application Method	**Borehole Backfill**	
Spacing Within Rows (ft)	**10.0**	
Spacing Between Rows (ft)	**25.0**	
Application Points	**28**	**Input special application instructions here as needed.**
Areal Extent (square ft)	7,000	
Top Application Depth (ft bgs)	70	
Bottom Application Depth (ft bgs)	85	
ORC Advanced to be Applied (lbs)	**11,075.1**	**Field Mixing Ratios**
ORC Advanced per point (lbs)	396	Water per Pt (gals)
Percent Slurry	**n/a**	n/a
Volume Water (gals)	**n/a**	ORC Advanced per Pt (lbs)
Volume ORC Advanced (gals)	498	396
Total Application Volume (gals)	**n/a**	Total Volume per Pt (gals)
Injection Volume per Point (gals)	n/a	n/a

Technical Notes/Discussion

Assumptions/Qualifications

In generating this preliminary estimate, Regenesis relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

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REGENESIS
1011 Calle Sombra
San Clemente, CA 92673-6244
Tel: 949.366.8000 • Fax: 949.366.8090

Terms and Conditions
Products and Services

1. PAYMENT TERMS. Net 30 Days. Accounts outstanding after 30 days will be assessed 1.5% monthly interest. Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available for cash or check payments only. We accept Master Card, Visa and American Express.

2. RETURN POLICY. A 15% re-stocking fee will be charged for all returned goods. All requests to return product must be pre-approved by seller. Returned product must be in original condition and no product will be accepted for return after a period of 90 days.

3 FORCE MAJEURE. Seller shall not be liable for delays in delivery or services or failure to manufacture or deliver due to causes beyond its reasonable control, including but not limited to acts of God, acts of buyer, acts of military or civil authorities, fires, strikes, flood, epidemic, war, riot, delays in transportation or car shortages, or inability to obtain necessary labor, materials, components or services through seller's usual and regular sources at usual and regular prices. In any such event Seller may, without notice to buyer, at any time and from time to time, postpone the delivery or service dates under this contract or make partial delivery or performance or cancel all or any portion of this and any other contract with buyer without further liability to buyer. Cancellation of any part of this order shall not affect Seller's right to payment for any product delivered or service performed hereunder.

4. LIMITED WARRANTY. Seller warrants the product(s) sold and services provided as specified on face of invoice, solely to buyer. Seller makes no other warranty of any kind respecting the product and services, and expressly DISCLAIMS ALL OTHER WARRANTIES OF WHATEVER KIND RESPECTING THE PRODUCT AND SERVICES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND NON-INFRINGEMENT.

5. DISCLAIMER. Where warranties to a person other than buyer may not be disclaimed under law, seller extends to such a person the same warranty seller makes to buyer as set forth herein, subject to all disclaimers, exclusions and limitations of warranties, all limitations of liability and all other provisions set forth in the Terms and Conditions herein. Buyer agrees to transmit a copy of the Terms and Conditions set forth herein to any and all persons to whom buyer sells, or otherwise furnishes the products and/or services provided buyer by seller and buyer agrees to indemnify seller for any liability, loss, costs and attorneys' fees which seller may incur by reason, in whole or in part, of failure by buyer to transmit the Terms and Conditions as provided herein.

6. LIMITATION OF SELLER'S LIABILITY AND LIMITATION OF BUYER'S REMEDY. Seller's liability on any claim of any kind, including negligence, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery. resale, repair or use of any goods or performance of any services covered by or furnished hereunder, shall in no case exceed the lesser of (1) the cost of repairing or replacing goods and repeating the services failing to conform to the forgoing warranty or the price of the goods and/or services or part thereof which gives rise to the claim. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOST PROFITS, OR FOR DAMAGES IN THE NATURE OF PENALTIES.

7. INDEMNIFICATION. Buyer agrees to defend and indemnify seller of and from any and all claims or liabilities asserted against seller in connection with the manufacture, sale, delivery, resale or repair or use of any goods, and performance of any services, covered by or furnished hereunder arising in whole or in part out of or by reason of the failure of buyer, its agents, servants, employees or customers to follow instructions, warnings or recommendations furnished by seller in connection with such goods and services, by reason of the failure of buyer, its agents, servants, employees or customers to comply with all federal, state and local laws applicable to such goods and services, or the use thereof, including the Occupational Safety and Health Act of 1970, or by reason of the negligence or misconduct of buyer, its agents, servants, employees or customers.

8. EXPENSES OF ENFORCEMENT. In the event seller undertakes any action to collect amounts due from buyer, or otherwise enforce its rights hereunder, Buyer agrees to pay and reimburse Seller for all such expenses, including, without limitation, all attorneys and collection fees.

9. TAXES. Liability for all taxes and import or export duties, imposed by any city, state, federal or other governmental authority, shall be assumed and paid by buyer. Buyer further agrees to defend and indemnify seller against any and all liabilities for such taxes or duties and legal fees or costs incurred by seller in connection therewith.

10. ASSISTANCE AND ADVICE. Upon request, seller in its discretion will furnish as an accommodation to buyer such technical advice or assistance as is available in reference to the goods and services. Seller assumes no obligation or liability for the advice or assistance given or results obtained, all such advice or assistance being given and accepted at buyer's risk.

11. SITE SAFETY. Buyer shall provide a safe working environment at the site of services and shall comply with all applicable provisions of federal, state, provincial and municipal safety laws, building codes, and safety regulations to prevent accidents or injuries to persons on, about or adjacent to the site.

12. INDEPENDENT CONTRACTOR. Seller and Buyer are independent contractors and nothing shall be construed to place them in the relationship of partners, principal and agent, employer/employee or joint ventures. Neither party will have the power or right to bind or obligate the other party except as may be expressly agreed and delegated by other party, nor will it hold itself out as having such authority.

13. REIMBURSEMENT. Seller shall provide the products and services in reliance upon the data and professional judgments provided by or on behalf of buyer. The fees and charges associated with the products and services thus may not conform to billing guidelines, constraints or other limits on fees. Seller does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where seller may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by seller, it is the sole responsibility of the buyer or other entity seeking reimbursement to ensure the products and services and associated charges are in compliance with and acceptable to the Government prior to submission. When serving as a supplier or subcontractor to an entity which seeks reimbursement from the Government, seller does not knowingly present or cause to be presented any claim for payment to the Government.

14. APPLICABLE LAW/JURISDICTION AND VENUE. The rights and duties of the parties shall be governed by, construed, and enforced in accordance with the laws of the State of California (excluding its conflict of laws rules which would refer to and apply the substantive laws of another jurisdiction). Any suit or proceeding hereunder shall be brought exclusively in state or federal courts located in Orange County, California. Each party consents to the personal jurisdiction of said state and federal courts and waives any objection that such courts are an inconvenient forum.

15. ENTIRE AGREEMENT. This agreement constitutes the entire contract between buyer and seller relating to the goods or services identified herein. No modifications hereof shall be binding upon the seller unless in writing and signed by seller's duly authorized representative, and no modification shall be effected by seller's acknowledgment or acceptance of buyer's purchase order forms containing different provisions. Trade usage shall neither be applicable nor relevant to this agreement, nor be used in any manner whatsoever to explain, qualify or supplement any of the provisions hereof. No waiver by either party of default shall be deemed a waiver of any subsequent default.

REGENESIS

Remedial Design Assumptions and Qualifications

Cost Estimate Disclaimer: The cost listed assumes conditions set forth within the proposed scope of work and assumptions and qualifications. Changes to either could impact the final cost of the project. This may include final shipping arrangements, sales tax or application related tasks such as product storage and handling, access to water, etc. If items listed need to be modified, please contact Regenesis for further evaluation.

Shipping Estimates: Shipping estimates are valid for 30 days. All shipping charges are estimates and actual freight charges are calculated at the time of invoice. Additional freight charges may be assessed for any accessorial requested at the time of delivery. The estimate included within assumes standard shipping.

Standard delivery is between 8am -5pm Monday –Friday. *accessorial – can include, but not limited to lift gate and pallet jack at delivery, inside delivery, time definite deliveries, and delivery appointments.

Please communicate any requirements for delivery with the customer service department at the time the order is placed.

Return Policy: To initiate a return please contact your local sales manager for an RMA. A 15% re-stocking fee will be charged for all returned goods. Return freight must be prepaid. All requests to return product must be in original condition and no product will be accepted for return after 90 days from date of delivery.

Professional Judgement: In generating this estimate, REGENESIS relied upon professional judgment and site specific information provided by others. Using this information as input, we performed calculations based upon known chemical and geologic relationships to generate an estimate of the mass of product and subsurface placement required to affect remediation of the site.

REGENESIS developed this Scope of Work in reliance upon the data and professional judgments provided by those whom completed the earlier environmental site assessment(s). The fees and charges associated with the Scope of Work were generated through REGENESIS' proprietary formulas and thus may not conform to billing guidelines, constraints or other limits on fees. REGENESIS does not seek reimbursement directly from any government agency or any governmental reimbursement fund (the "Government"). In any circumstance where REGENESIS may serve as a supplier or subcontractor to an entity which seeks reimbursement from the Government for all or part of the services performed or products provided by REGENESIS, *it is the sole responsibility of the entity seeking reimbursement to ensure the Scope of Work and associated charges are in compliance with and acceptable to the Government prior to submission*. When serving as a supplier or subcontractor to an entity which seeks reimbursement from Government, REGENESIS does not knowingly present or cause to be presented any claim for payment to the government.

REGENESIS
Technology-Based Solutions for the Environment

1011 Calle Sombra
San Clemente, CA 92673
US

PRICE QUOTATION
(valid for only 30 days from date of quote)

Contact Name	Tim Haller	Account Name	Haller & Associates
Created Date	3/4/2019	Prepared By	David Batt
Quote Name	Indian Hills Canyon Auto - BrG60719		

Thank you for your interest in Regenesis Products. Please find below the sales price and related shipping, handling and tax costs per your request.
Please note that a Price Quotation is not a sales order. To place an order please contact our customer service department at 949 366-8000 or order online at http://www.regenesis.com/order.

Products

Product Code	Product	Quantity	Sales Price	Total Price
1900	ORC Advanced Pellets Pail (55.1 lb)	11,075.10	USD 8.35	USD 92,477.09

Special Delivery Instructions	R&L Carriers - Standard shipping with lift gate and pallet jack at delivery.	Subtotal	USD 92,477.09
		Tax	USD 4,889.63
		Estimated Shipping/Freight	USD 2,530.30
		Handling Fees	USD 400.00
		Grand Total	USD 100,297.02
Payment Terms	Net 30	Ship From	Chino, CA

PAYMENT TERMS: Accounts outstanding after the listed payment terms will be assessed 1.5% monthly interest.
Volume discount pricing will be rescinded on all accounts outstanding over 90 days. An early payment discount of 1.5% Net 10 is available on cash or check payment only.

RETURN POLICY: All requests to return product must be pre-approved by Regenesis. A 15% re-stocking fee will be charged for all returned goods. Return freight must be prepaid and product must be in saleable condition. No product will be accepted for return after of 90 days from original delivery date.

SHIPPING POLICY: the following terms and conditions shall apply

1. As a service Regenesis will assist and coordinate with independent trucking brokers/carriers the delivery of product. Regenesis will also coordinate a "will call" pick up at one of its warehouse locations with a customer's freight carrier of choice. Please note that product availability will vary by warehouse location.
2. All quoted rates and delivery dates are based on Standard Delivery Terms, which allow or provide only an estimated date and time of delivery of product to a site. Delivery times will vary per carrier. A Guaranteed Delivery can be arranged for an additional cost, and must be place 7 days prior to shipment. Under a Guarantee Delivery, if the product is not delivered per the specified date and time, the carrier will refund some amount up to the full transportation costs associated with the shipment.
3. Shipping /Freight costs are estimates and may change pending requirement of any additional equipment or change in volume or delivery instructions at time of placing order.

SHIPPING DISCLAIMER: Regenesis is not in the business of shipping or transportation of its products. We will strive to assist in meeting shipping requirements, but please realize that all shipments are subject to carriers availability, weather, mechanical problems, or other unforeseen circumstances. As a result Regenesis can not be held responsible for project/site costs incurred due to shipping related problems.
Sales Tax: Sales tax charges are estimated on the quote/ sales confirmations based on delivery location. The actual sales tax rate is

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1011 Calle Sombra
San Clemente, CA 92673
US

calculated at time of invoice. Variations due to, but not limited to county and or local sales tax rates.

Sales Tax: Sales tax charges are estimated on the quote/ sales confirmations based on delivery location. The actual sales tax rate is calculated at time of invoice. Variations due to, but not limited to county and or local sales tax rates.

Resale /Tax Exempt Certificate: A Re-Sales Certificate or Tax Exempt Certificate must be presented to the customer service department at the time an order is placed.

Handling Fee: Handling Fees may be subject to sales tax based on point of delivery.

Freight: Freight charges are estimates and actual freight charges are calculated at the time of invoice. Additional freight charges may be assessed for any accessorial requested at the time of delivery. Please communicate any requirements for delivery with the customer service department at the time the order is placed. Standard delivery is between 8am -5pm Monday –Friday. *accessorial – can include, but not limited to lift gate and pallet jack at delivery, inside delivery, time definite deliveries, and delivery appointments.

RODGERS & COMPANY, INC.

2615 ISLETA BLVD SW • ALBUQUERQUE, NM 87105 • 505-877-1030 • FAX: 505-877-1105

March 6, 2019

Tim Haller
Haller & Associates, Inc.
P.O. Box 729
Tijeras, NM 87059

re: cost proposal for environmental services, Indian Hills, Tijeras, NM (update2)

Dear Mr. Haller,

Thank you for calling today. I have reviewed and updated this proposal. Based on available information on declining water levels resulting in increased drill depth from 80 ft to 83 ft and discussion about desirable drilling conditions, we have revised pricing on original items. Additionally, we have included an item and price to supply 100 ft3 of 8-12 graded sand to mix with ORC-A.

item	description -drill twenty eight bores and backfill to workplan specifications	unit	est quant	unit price	amount
1	Mob/demob	ls	1	$14,600.00	$14,600.00
2	Labor to rig up and down, move between bores, and set temporary casing as needed	ea	28	$800.00	$22,400.00
3	Drilling by air rotary method twenty eight (28) 10" bores to 83'	ft	2324	$26.50	$61,586.00
4	Labor to complete each bore by installing oxygenating pellets by tremie, backfilling bore with cuttings to 20' and grouting upper 20' to grade	ea	28	$1,650.00	$46,200.00
5	Cuttings containment (Customer to supply tactor to spread cuttings)	ls	1	$2,025.00	$2,025.00
6	Supply 8-12 silica sand	ft3	100	$28.50	$2,850.00
Subtotal Amount					$149,661.00

Proposed drilling rig is a Gefco 30K top head drive unit in excellent condition (see attached information). Prices do not include site access, disposal of work-derived wastes, permits, damage to mis-located underground utilities, traffic control, provision of ORC-A, or any applicable gross receipts tax. We estimate the scope of work will take up to 42 days to complete. Contact me with any questions. Prices subject to change if not accepted within 15 days. Thank you.

Jeff Watson
RODGERS & COMPANY, INC.

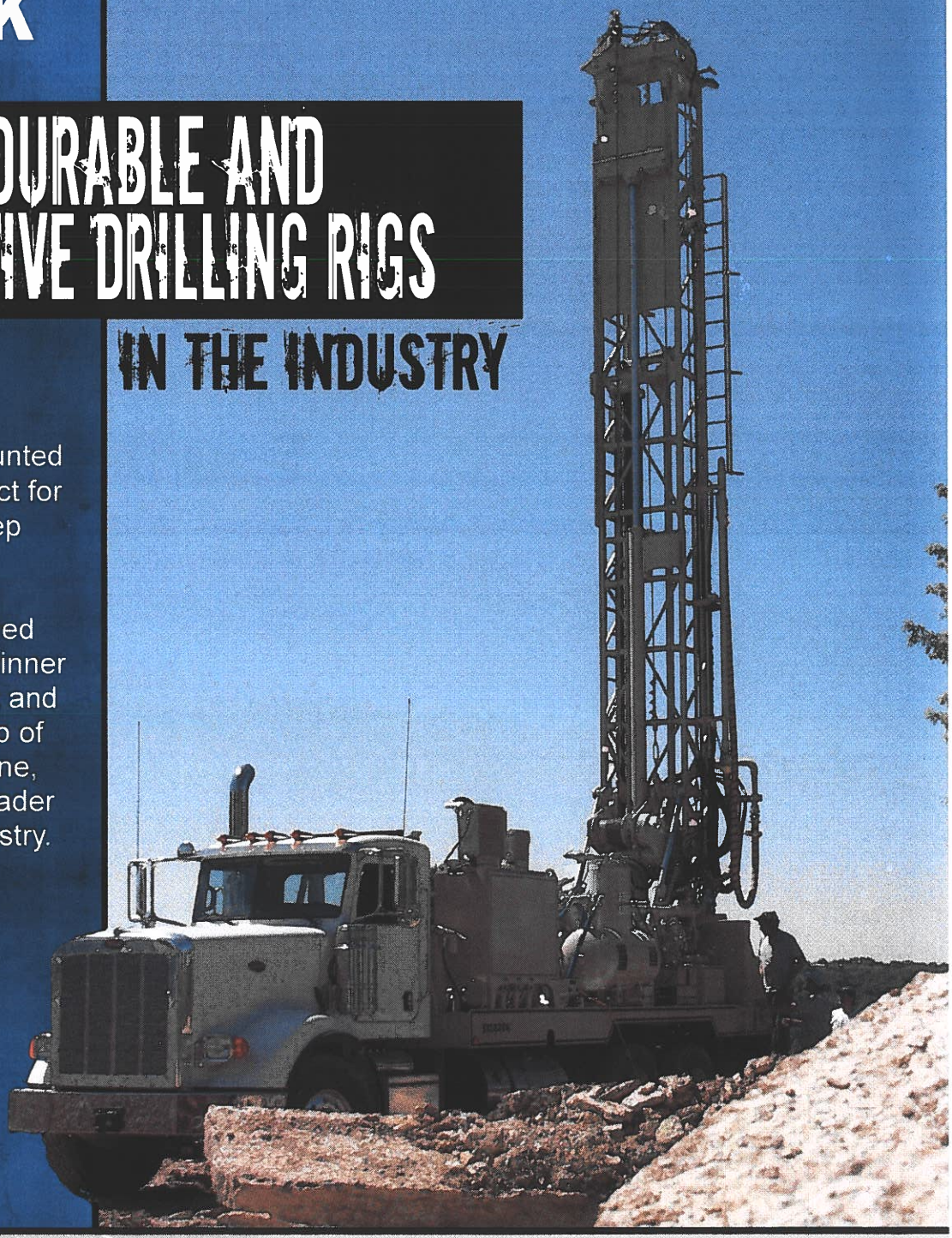
xc: file

RODGERS & COMPANY, INC.

GEFCO 30K

THE MOST DURABLE AND PRODUCTIVE DRILLING RIGS IN THE INDUSTRY

The ***GEFCO 30K***, mounted on a 6 x 4 truck, is perfect for shallow municipal or deep residential water wells. 25,000-lbs (11,340 kg) single-line winch combined with the hydraulic rod spinner makes tool handling fast and easy. This is the flagship of the GEFCO water well line, and continues to be a leader in the ground water industry.



GEFCO

An Astec Industries Co.

GEFCO 30K

Top Head Drive Drilling Rig

SPECIFICATIONS

MOUNTING	6 x 4 Truck, 565 HP diesel engine, 68,000 lbs (30,845 kgs) GWVR.
MAST	35 ft (10.7 M) height above breakout table.
TOPHEAD	5,833 ft/lbs (7,909 Nm) of torque. 0-120 RPM. 2 11/16 in (68.2 mm) diameter opening through quill. 29 ft (8.8 M) of travel.
PULLDOWN/HOLDBACK	Pulldown capacity up to 25,000 lbs (11,340 kgs). Holdback capacity up to 30,000 lbs (13,608 kgs).
HYDRAULIC HOISTING DRUM	25,000 lbs winch over jib boom. Line runs over jib bocm for positioning drill pipe over the centerline of the bore hole or pipe rack.
LEVELING JACKS	Hydraulic leveling jacks; two (2) 48 in (1219 mm) stroke front jacks located behind truck cab. Two (2) 36 in (914 mm) stroke rear jacks.
AIR COMPRESSOR	2-Stage twin screw 1,000 CFM @ 350 PSI (28.2m^{3}min/24.1 bar). Equipped with clutch.
BREAKOUT TABLE	Retracts hydraulically to provide 18 in (457 mm) opening in frame. Sliding holding wrench to hold pipe.
WATER INJECTION LUBRICATOR	18 GPM (68 LMP) four (4) cylinder pump. Seven (7) gallon (26.5 L) capacity, electrically controlled. Maximum displacement 3 qts/hr (2.8 L/hr).
CAROUSEL	Six (6) pod carousel for 4 1/2 in x 20 ft (114 mm x 6.1 M) or 3 1/2 in x 20 ft (88.9 mm x 6.1 M) drill pipe. (Pipe included).
PIPE LOADER	Single pipe loader for 4 1/2 in x 20 ft (114 mm x 6.1M) or 3 1/2 in x 20 ft (88.9 mm x 6.1M) drill pipe.
PIPE SPINNER	Hydraulically powered spinner for spinning pipe in or out.
BREAKOUT WRENCH	Modified 60 in (1.5 M) pipe wrench hydraulically controlled.
PIPE CARRYING RACK	Mounted on the right side of the frame. Maximum capacity of 15 pieces of 4 1/2 in x 20 ft (114 mm x 6.1 M) drill pipe, or 18 pieces of 3 1/2 in x 20 ft (88.9 mm x 6.1 M) drill pipe, total pipe capacity.
REMOTE JIB CONTROLS	Independent controls located opposite driller's side for jib and winch functions.
WEIGHT AND DIMENSIONS	Length: 35 ft 6 in (10.8 M). Width: 8 ft 6 in (2.6 M). Height: 13 ft 3 in (3.8 M) Approximate weight: 56,000 lbs (25,401 kgs) Based on options.

POPULAR OPTIONS

MUD PUMPS	Choose from 5 x 6 piston pump, 4 x 3 centrifugal pump or diaphragm pump.
AUXILIARY WINCHES	Tool handling winches available.
WELDER	Hydraulically driven welder with accessory power and weatherproof cover (Diesel option)
ENGINE HEATER	40,000 BTU Engine heater.
CASING HAMMER	Hydraulic or air operated casing hammer package.

GEFCO, INC. an Astec Industries Company

2215 SOUTH VAN BUREN · ENID. OK 73703 · PHONE 580.234.4141 · domsales@gefco.com · intsales@gefco.com · www.gefco.com

Southwest Safety Services, Inc.
P.O. Box 9227
Albuquerque, NM 87119
505-873-0044
Fax 505-873-0088

Estimate

Estimate Date	Estimate ID
3/5/2019	GT030519H

Valid Through:

Haller & Assoc (ALB)
TIM HALLER
PO Box 1667
Cedar Crest, NM 87008
Phone: 505-281-9333
Fax: 505-281-9338
Email: timhaller@vcimail.com

Job Location:
NM 333 MP 10.2
TIJERAS
Estimate Created By: George Thompson
Estimated Days: 45

Item Description	Price	UOM	Qty/Day	Days	Total Qty.	Total
1Man/Truck Per HR *	$59.00	Per Hour	2	1	2	$118.00
1Man/Truck Per Hr - After Hours *	$75.00	Per Hour	2	1	2	$150.00
Barrel *	$0.99	Per Day	15	45	675	$668.25
Sign-Medium *	$1.39	Per Day	8	45	360	$500.40
Equipment			1			
Spring Stand *	$2.31	Per Day	8	45	360	$831.60
One Time Charges			1			
18" Flag W/ Dowel *	$3.25	Per Each	16	1	16	$52.00
Sand Bag *	$2.00	Per Each	16	1	16	$32.00
Labor			1			

Note: The * indicates taxable items.

EQUIPMENT	$2,000.25
ONE TIME CHARGES	$84.00
LABOR	$268.00
SUBTOTAL	$2,352.25
SALES TAX (7.875%)	$185.24
ESTIMATE TOTAL	$2,537.49

PRICE BASED ON JOB PLANS AND A DURATION OF 45 CALENDAR DAYS.

FED. ID# 85-045-7665, NM CONTRACTORS LICENSE# 82265
CLASSIFICATION# GA05
NM DEPT OF LABOR PUBLIC WORKS REGISTRATION
#002405420120305 NMDOL Expiration Date: 4/08/2021.
Resident Contractor Certification No. L0350944048 Expires: 05/03/2021

Scope: Setup traffic control per approved traffic control plan (TCP)

Actual Equipment And Labor Will Be Charged.

Included: CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE, VANDALISM, AND STOLEN EQUIPMENT.

Excluded: Price does not include Tax, Flaggers, Flag Line, Road Markings, Bond, Permit Fees or Portable Message Boards.

Add'l Terms: All jobs must be scheduled with our dispatch.

Traffic Control Plans Available at $75.00 Per Page for Non RPE Stamped and $225.00 Per Page for RPE Stamped.

Invoices are payable with Terms of Net 30 Days.

3/5/2019

George Thompson

Date

Southwest Safety Services, Inc.

Visit Our Website at www.swsafetyservices.com

Accepted By:

Signature

Date

Print Name

Title

Company

APPENDIX C

COST DETAIL FORMS

NM CORRECTIVE ACTION FUND COST DETAIL FORM
SUMMARY SHEET

Site:	Site Address:
Indian Hills Complex - Canyon Auto	845 E. Highway 333 (I-40 Zuzax Exit 178) Tijeras, NM 87059

Check one only:	Check one only:	
☑ Work Plan	☐ Minimum Site Assessment	☐ Ph 3 Reclamation Proposal
☐ Claim	☐ Ph 1 Hydrogeo Investigation	☐ Ph 4 Reclamation Implementation
	☐ Ph 2 Free Product/Saturated Soil Recovery	☑ Ph 5 Operations and Maintenance

Del ID(s):	Brief description of deliverable:	NMED USE ONLY
All	Permits and Fees, ORC-A Purchase, Drilling and Backfilling, Contingency & Reports	

SUMMARY SHEET			TOTAL	PROJECT MANAGER	AUDITOR
PROFESSIONAL SERVICES			$208,726.75		
TAXABLE EXPENSES			$100,104.89		
TAXABLE SUBCONTRACTORS			$0.00		
		TAXABLE SUBTOTAL	$308,831.64		
	NM GRT RATE:	6.4375%	$19,881.04		
		TOTAL	$328,712.68		
NONTAXABLE EXPENSES			$840.00		
NONTAXABLE SUBCONTRACTORS			$0.00		
		NONTAXABLE SUBTOTAL	$840.00		
		GRAND TOTAL OF CLAIM	$329,552.68		

NM CORRECTIVE ACTION FUND COST DETAIL FORM
PROFESSIONAL SERVICES

Site:	**Site Address:**
Indian Hills Complex - Canyon Auto	845 E. Highway 333 (I-40 Zuzax Exit 178) Tijeras, NM 87059

Check one only:

- ☑ Work Plan
- ☐ Claim

Check one only:

- ☐ Minimum Site Assessment
- ☐ Ph 1 Hydrogeo Investigation
- ☐ Ph 2 Free Product/Saturated Soil Recovery
- ☐ Ph 3 Reclamation Proposal
- ☐ Ph 4 Reclamation Implementation
- ☑ Ph 5 Operations and Maintenance

Del ID(s):	**Brief description of deliverable:**
All	Permit Applications, Drilling and ORC-A Backfilling, Traffic Control, Implementation Report

NMED USE ONLY

PROFESSIONAL SERVICES	INVOICE #	RATE	UNIT	#OF UNITS	TOTAL
GWQB Discharge Permit & Public Notice	NA	3,400.00	LS	1	$3,400.00
NMDOT Utility and Traffic Control Permits	NA	1,917.50	LS	1	$1,917.50
NMOSE Permit and Plugging Plan	NA	1,740.00	LS	1	$1,740.00
ORC-A Unloading and Letter Report	NA	1,510.00	LS	1	$1,510.00
Drilling, Backfilling, Traffic Control and Letter Report	NA	194,504.25	LS	1	$194,504.25
ORC-A Implementation Report	NA	5,655.00	LS	1	$5,655.00
SUBTOTAL					$208,726.75

PROJECT MANAGER	AUDITOR

3/7/2019

NM CORRECTIVE ACTION FUND COST DETAIL FORM
EXPENSES

Site:	Site Address:
Indian Hills Complex - Canyon Auto	845 E. Highway 333 (I-40 Zuzax Exit 178) Tijeras, NM 87059

Check one only:

- ☑ Work Plan
- ☐ Claim

Check one only:

- ☐ Minimum Site Assessment
- ☐ Ph 1 Hydrogeo Investigation
- ☐ Ph 2 Free Product/Saturated Soil Recovery
- ☐ Ph 3 Reclamation Proposal
- ☐ Ph 4 Reclamation Implementation
- ☑ Ph 5 Operations and Maintenance

Del ID(s): **Brief description of deliverable:**
Permit Fees, ORC-A Purchase and Shipping, Contingency Set-Aside

NMED USE ONLY

EXPENSES	INVOICE #	RATE	UNIT	#OF UNITS	TOTAL	PROJECT MANAGER	AUDITOR
NONTAXABLE							
Discharge Permit Application Fee	NA	$100.00	LS	1	$100.00		
General Discharge Permit Fee	NA	$600.00	LS	1	$600.00		
NMOSE Permit Fee	NA	$5.00	Boring	28	$140.00		
NONTAXABLE SUBTOTAL					$840.00		
TAXABLE							
ORC-A (11,075 pounds)	NA	92,477	LS	1	$92,477.00		
Handling Charge	NA	$400.00	LS	1	$400.00		
Estimated Shipping Charge	NA	$2,530.30	LS	1	$2,530.30		
Contingency Set-Aside Funds	NA	$4,697.59	N/A	1	$4,697.59		
TAXABLE SUBTOTAL					$100,104.89		

APPENDIX B

GROUNDWATER MONITORING WORKPLAN

2.0 BASELINE GROUNDWATER MONITORING EVENT

The most recent groundwater analytical data were obtained in October 2017. Therefore, a site-wide groundwater monitoring event will be performed. All 14 monitor wells and remediation wells at Turner Branch and Canyon Auto will be gauged and sampled to establish current static water levels, groundwater flow direction and contaminant concentrations. Three private water wells will be sampled. The monitoring regimen is summarized in Table 1. Analytical requirements are summarized in Table 2.

2.1 Notifications

Notification of the groundwater monitoring field schedule will be provided to the NMED-PSTB, NMDOT and the following property owners: Estate of Turner Branch, Fred Soll, Not Just Closets and Caroline Pape. Notifications will be provided by email at least 96 hours prior to start of fieldwork.

2.2 Water Level Measurements

Static water levels and total depths will first be gauged in all monitor wells and remediation wells using an electronic interface probe. Measurements will be made relative to the top-of-casing to the nearest 0.01 foot.

2.3 Groundwater Sampling and Analysis

All 14 monitor wells and remediation wells will be purged of a minimum of 5 well volumes or until dry, whichever occurs first, prior to sampling. The 2-inch diameter monitor wells will be purged using new 1.5-inch diameter polyethylene disposable bailers. The 4-inch diameter remediation wells will be purged and sampled using a Grundfos RediFlo2 submersible pump and new ⅜-inch diameter disposable poly tubing.

Field parameters of pH, specific conductivity, temperature, dissolved oxygen (DO) and oxidation-reduction potential (ORP) will be recorded at each purged well volume. Groundwater samples will be decanted into 40-milliliter glass vials with mercuric chloride and sodium thiosulfate preservatives. Each vial will be filled to a meniscus, leaving no bubbles or headspace. All samples will be labeled, placed on ice, and delivered to Hall Environmental Analysis Laboratory, Inc. with chain-of-custody records.

2.4 Private Well Sampling and Analysis

Three private water wells that were historically impacted with petroleum contaminants (Fred Soll, Not Just Closets and Caroline Pape will be purged and sampled during the baseline monitoring event.

The water well at the Fred Soll property does not have a functioning pump. Therefore, this well will be gauged as described in Section 2.2 of this workplan to determine water level, total depth and to calculate purge volume. The well will then be purged and sampled using a Grundfos RediFlo2 submersible pump and new disposable polyethylene tubing as described in Section 2.3 of this workplan.

The water wells at the Not Just Closets property and Caroline Pape property will be purged using their existing dedicated pumps. Both wells will be purged using the hydrants located closest to the wells. Purging will be performed for approximately 10 to 15 minutes prior to sample collection. After purging, the hydrants will be fitted with a ¼-inch diameter sample valve to facilitate low-flow, non-turbulent sample collection.

Private water wells samples will be decanted into 40-milliliter glass vials with mercuric chloride and sodium thiosulfate preservatives. Each vial will be filled to a meniscus, leaving no bubbles or headspace. The samples will be labeled, placed on ice, and delivered to Hall Environmental Analysis Laboratory, Inc. with chain-of-custody records.

All 17 groundwater samples will be analyzed for the following:

- Volatile Organic Compounds (VOCs) + Naphthalenes - EPA Method 8260B
- Ethylene Dibromide (EDB) – EPA Method 504.1

For purposes of the injection discharge permit, the sample from TBMW-5 will also be analyzed for cation/anion balance, alkalinity, total dissolved solids, biological oxygen demand and chemical oxygen demand (Table 2). The baseline monitoring budget also includes costs for post-injection sampling of these parameters.

2.5 Baseline Groundwater Monitoring Report

The baseline groundwater monitoring report will present current contaminant concentrations with respect to NMWQCC standards. The report will include discussion of changes and trends in groundwater elevations and flow direction, dissolved contaminant concentrations, dissolved contaminant distribution, and the degree of contaminant rebound since the remediation system was turned off in October 2017.

Field and laboratory data will be summarized in cumulative tables. Figures and appendices will include a site location map, site maps based on satellite imagery, water table maps, analytical results maps, dissolved contaminant plume maps, and graphs of water levels and dissolved contaminant concentrations versus time, field data forms, hydraulic gradient calculations, sampling protocols and the laboratory reports.

6.0 QUARTERLY GROUNDWATER MONITORING

~~Quarterly groundwater monitoring will be performed concurrent with the remediation system O&M and PersulfOx injection events. The first quarter event will be performed after 3 months of system operation. The PersulfOx injection events will be performed during the second quarter. Initial results of the injection events will be determined during the second quarter monitoring event. Longer term effects, and the presence or absence of contaminant rebound, will be evaluated during the third and fourth quarter events.~~

6.1 Groundwater Monitoring Methodologies

Water level measurements and groundwater sampling will be performed in accordance with methods described in Sections 2.2 through 2.4 of this workplan. The quarterly groundwater monitoring regimen is summarized in Table 1.

6.2 Quarterly O&M and Groundwater Monitoring Reports

This task includes preparation of the quarterly reports summarizing ~~remediation system O&M and~~ quarterly groundwater monitoring. The reports will include the following elements, as applicable:

- Summary of activities performed and sampling protocols
- Results
- ~~Mass removal rates (during system operation)~~
- Concentration trends and fluid level trends
- Conclusions and recommendations
- Figures:
  - Site map
  - Groundwater elevation map
  - NAPL distribution and thickness map (if applicable)
  - ~~Field vacuum distribution map (during system operation)~~
  - Distribution of dissolved organic contaminants
- Tables:
  - Groundwater levels
  - Summary of analytical results for groundwater ~~and vapor samples~~
  - ~~Summary of operating parameters (during system operation)~~
- ~~Calculations (during system operation):~~
  - ~~Mass Removal Rates – Groundwater Extraction~~
  - ~~Mass Removal Rates – Soil Vapor Extraction~~
  - ~~Mass Destruction Rates – Bioventing~~
- Appendices:
  - ~~O&M Field Forms~~
  - Groundwater Sampling Field Forms
  - Analytical Reports

NOTE TO GWQB: Text with red strike-through is applicable to Turner Branch site, and is not applicable to Canyon Auto site.

TABLE 1. BASELINE AND QUARTERLY GROUNDWATER MONITORING REGIMEN
INDIAN HILLS COMPLEX, TIJERAS, NEW MEXICO

Location	Well ID	Gauging Regimen	Sampling Regimen					Analytical Regimen		
		Every Event	Baseline*	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	VOCs EDB	Cations Anions*	Field Parameters
Canyon Auto	CAMW-8	X	X	X	X	X	X	X		X
	CAMW-24	X	X	X	X	X	X	X		X
	CAMW-29	X	X				X	X		X
	CAMW-30	X	X				X	X		X
	CAMW-31B	X	X				X	X		X
	CAMW-32	X	X	X	X	X	X	X		X
Turner Branch	TBMW-5	X	X	X	X	X	X	X	X	X
	TBMW-6	X	X				X	X		X
	TBMW-7	X	X				X	X		X
	TBMW-27	X	X	X	X	X	X	X		X
	TBMW-28	X	X				X	X		X
	MPE-1	X	X	X	X	X	X	X		X
	MPE-2	X	X				X	X		X
	SVE-1	X	X				X	X		X
Private Wells	Fred Soll	X	X		X		X	X		X
	Not Just Closets		X		X		X	X		X
	Caroline Pape		X		X		X	X		X
TOTALS		15	17	6	9	6	17	55	2	55

NOTES:
*Cation/anion balance will be analyzed for MW-5 in baseline event and after 2nd PersulOx injection event
EDB = Ethylene Dibromide by EPA Method 504.1
VOCs = Volatile Organic Compounds + Naphthalenes by EPA 8260B
Field Parameters = pH, temperature, specific conductance, oxidation-reduction potential and dissolved oxygen
X = Scheduled to be sampled and/or gauged

TABLE 2. SAMPLE ANALYTICAL AND QUALITY CONTROL REQUIREMENTS
INDIAN HILLS COMPLEX, TIJERAS, NEW MEXICO

Target Analytes	Matrix	Analytical Method	Sample Container	Sample Preparation	Preservative	Holding Time
VOCs TPH-gas	Water	8260B 8015B	3 x 40 mL glass vials	sample vials filled with no bubbles/headspace	Mercuric Chloride	14 Days
EDB	Water	504.1	2 x 40 ml glass vials	sample vials filled with no bubbles/headspace	Sodium Thiosulfate	14 Days
Total Lead	Water	6010	1 x 120 mL poly bottle	fill bottle to shoulder	Nitric Acid	6 Months
Cation/Anion Balance, Alkalinity, Total Dissolved Solids	Water	SM 2320B 300.0 120.1 SM 2540C	1 x 250 mL poly bottle 1 x 250 mL poly bottle 1 x 1L poly bottle 1 x 250 mL poly bottle	fill bottles to shoulder	None Sulfuric Acid None None	48 Hours
BOD COD	Water	SM 5210B 410 Modified	1 x 2L poly bottle 1 x 125 mL poly bottle	fill bottles to shoulder	None	48 Hours
BTEX TPH-gas	Air	EPA TO-3	1 x 1L Summa canister	confirm canister vacuum of >22 inches Hg prior to sampling	None	7 Days
Fixed Gases	Air	ASTM D1945	1 x 1L Summa canister	confirm canister vacuum of >22 inches Hg prior to sampling	None	7 Days

NOTES:
BOD = Biological Oxygen Demand
COD = Chemical Oxygen Demand
EDB = Ethylene Dibromide
TPH-gas = Total Petroleum Hydrocarbons - gasoline range
VOCs = Volatile Organic Compounds

TABLE 5. SUMMARY OF WELL DATA AND SAMPLING METHODS
INDIAN HILLS COMPLEX

CANYON AUTO (6 Wells)	DIAMETER (inches)	SAMPLE METHOD
CAMW-8	2	bailer
CAMW-24	4	RediFlo2 pump+tubing
CAMW-29	4	RediFlo2 pump+tubing
CAMW-30	2	bailer
CAMW-31B	4	RediFlo2 pump+tubing
CAMW-32	4	RediFlo2 pump+tubing
TURNER BRANCH (8 Wells)		
TBMW-5	2	bailer
TBMW-6	2	bailer
TBMW-7	2	bailer
TBMW-27	4	RediFlo2 pump+tubing
TBMW-28	2	bailer
MPE-1	4	RediFlo2 pump+tubing
MPE-2	4	RediFlo2 pump+tubing
SVE-1	2	bailer
PRIVATE WELLS (3)		
Fred Soll		RediFlo2 pump+tubing
Not Just Closets		dedicated pump
Caroline Pape		dedicated pump
TOTAL SAMPLED BY BAILER	**7**	
TOTAL SAMPLED BY REDIFLO2	**8**	
TOTAL BY DEDICATED PUMP	**2**	
TOTAL WELLS	**17**	

APPENDIX C

SPECIFICATIONS AND MSDS FOR OXYGEN RELEASE COMPOUND-ADVANCED™

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

ORC Advanced® is an engineered, oxygen release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. Upon contact with groundwater, this calcium oxyhydroxide-based material becomes hydrated producing a controlled release of molecular oxygen (17% by weight) for periods of up to 12 months on a single application.

Example of ORC Advanced

ORC Advanced decreases time to site closure and accelerates degradation rates up to 100 times faster than natural degradation rates. A single ORC Advanced application can support aerobic biodegradation for up to 12 months with minimal site disturbance, no permanent or emplaced above ground equipment, piping, tanks, power sources, etc are needed. There is no operation or maintenance required. ORC Advanced provides lower costs, greater efficiency and reliability compared to engineered mechanical systems, oxygen emitters and bubblers.

ORC Advanced provides remediation practitioners with a significantly faster and highly effective means of treating petroleum contaminated sites. Petroleum hydrocarbon contamination is often associated with retail petroleum service stations resulting from leaking underground storage tanks, piping and dispensers. As a result, ORC Advanced technology and applications have been tailored around the remediation needs of the retail petroleum industry and include: tank pit excavations, amending and mixing with backfill, direct-injection, bore-hole backfill, ORC Advanced Pellets for waterless and dustless application, combined ISCO and bioremediation applications, etc.

For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide

Chemical Composition

- Calcium hydroxide oxide
- Calcium hydroxide
- Monopotassium phosphate
- Dipotassium phosphate

Properties

- Physical state: Solid
- Form: Powder
- Odor: Odorless
- Color: White to pale yellow
- pH: 12.5 (3% suspension/water)

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

Storage and Handling Guidelines

Storage

- Store in a cool, dry place out of direct sunlight
- Store in original tightly closed container
- Store in a well-ventilated place
- Do not store near combustible materials
- Store away from incompatible materials
- Provide appropriate exhaust ventilation in places where dust is formed

Handling

- Minimize dust generation and accumulation
- Keep away from heat
- Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces
- Observe good industrial hygiene practices
- Take precaution to avoid mixing with combustibles
- Keep away from clothing and other combustible materials
- Avoid contact with water and moisture
- Avoid contact with eyes, skin, and clothing
- Avoid prolonged exposure
- Wear appropriate personal protective equipment

Applications

- Slurry mixture direct-push injection through hollow rods or direct-placement into boreholes
- *In situ* or *ex situ* slurry mixture into contaminated backfill or contaminated soils in general
- Slurry mixture injections in conjunction with chemical oxidants like RegenOx or PersulfOx
- Filter sock applications in groundwater for highly localized treatment
- *Ex situ* biopiles

Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection. Please review the ORC Advanced Safety Data Sheet for additional storage, usage, and handling requirements.

REGENESIS®

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1011 Calle Sombra, San Clemente CA 92673
949.366.8000

REGENESIS

In-Situ Remediation Data Interpretation Matrix

Analytical Parameter	Method	Chemical Oxidation (RegenOx™)		Expected Change	Aerobic Bioremediation (ORC-Advanced™)	Expected Change	Anaerobic Bioremediation (HRC™, HRC-X™, 3DME™)	Expected Change	Comments
		Soil	Groundwater		Groundwater		Groundwater		
Contaminants of Concern (COC's)		X	X	↓	X	↓	X	↓[3]	
pH	Meter reading taken in flow-through cell (DO can also be measured with a Hach kit)		X	↑	X	↑	X	↓	
Dissolved Oxygen (DO)			X	↑	X	↑	X	↓	
Oxidation Reduction Potential (ORP)			X	↑	X	↑	X	↓	
Total Fe	Colorimetric Hach Method or EPA 6000 series with filtered and unfiltered samples				X		X	↓	Total Fe can often rise along with Diss. Fe lab measurements since it is a measure of all Fe
Total Mn					X		X	↓	This can be similar to Fe
Dissolved Fe			X	↓	X	↓	X	↑	
Dissolved Mn					X	↓	X	↑	
Sulfate	EPA 375.3 or EPA 9056				X	↓	X	↓	ORC/ORC-A technically if a reduced aquifer the sulfides are made they *may* go back to sulfates; but if pyrite or other forms of sulfides form they may leave the system; a return of sulfates may not happen until more oxic GW coditions migrate into the reactive zone from upgradient
Nitrate	EPA 353.1 or EPA 9056				X	↓	X	↓	
Total Organic Carbon (TOC)	EPA 415.1 or EPA 9060	X	X	↓		↓	X	↑	TOC is linked to Metabolic Acids in HRC & 3DMe application sites
Chemical Oxygen Demand (COD)	EPA 410.1-.2	X	X	↓	X	↓[1]	X	↑	
Biological Oxygen Demand (BOD)		X	X	↓	X	↓[2]	X	↑	
Sodium			X	↑					
Alkalinity/CO2			X	↑	X	↑	X	↑	Alkalinity increases in any respiratory reactions due to the biproduct (CO2) being transformed via carbonate-bicarbonate cycle
Metabolic acids: lactic, pyruvic, acetic, propionic, and butyric	HPLC/UV (Call labs to determine)						X	↑[4]	
Methane, Ethane, Ethene,	ASTM D1945						X	↑	

Notes

1 & 2 Results may vary by sample depending upon biological growth occuring following presence of oxygen.

3- Parent compounds should decrease; daughter compounds should increase initially followed by a decrease

4- Metabolic acids recommended for HRC and HRC-X. Optional for 3DME.

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REGENESIS

Technology-Based Solutions for the Environment

SAFETY DATA SHEET

1. Identification

Product identifier **Oxygen Release Compound Advanced (ORC Advanced®)**

Other means of identification None.

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra
San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazards	Oxidizing solids	Category 2
Health hazards	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement May intensify fire; oxidizer. Causes skin irritation. Causes serious eye damage.

Precautionary statement

Prevention Keep away from heat. Keep/Store away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Wash thoroughly after handling. Wear protective gloves/eye protection/face protection.

Response If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Calcium hydroxide oxide	682334-66-3	≥85
Calcium hydroxide	1305-62-0	≤15
Dipotassium Phosphate	7758-11-4	<5
Monopotassium Phosphate	7778-77-0	<5

Composition comments All concentrations are in percent by weight unless otherwise indicated.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Rinse skin with water/shower. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.
Ingestion	Never give anything by mouth to a victim who is unconscious or is having convulsions. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.
General information	Take off all contaminated clothing immediately. Contact with combustible material may cause fire. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water spray, fog (flooding amounts). Foam. Dry chemical powder. Carbon dioxide (CO_2).
Unsuitable extinguishing media	None known.
Specific hazards arising from the chemical	Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: metal oxides.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.
Specific methods	Cool containers exposed to flames with water until well after the fire is out.
General fire hazards	May intensify fire; oxidizer. Contact with combustible material may cause fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect dust using a vacuum cleaner equipped with HEPA filter. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. Stop the flow of material, if this is without risk. Absorb in vermiculite, dry sand or earth and place into containers. Large Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Shovel the material into waste container. Minimize dust generation and accumulation. Avoid the generation of dusts during clean-up. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. Place all material into loosely covered plastic containers for later disposal. For waste disposal, see section 13 of the SDS. Wear appropriate protective equipment and clothing during clean-up.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Avoid contact with water and moisture. Do not get this material in contact with eyes. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Calcium hydroxide (CAS 1305-62-0)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection

Use dust-tight, unvented chemical safety goggles when there is potential for eye contact.

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. Frequent change is advisable. Recommended gloves include rubber, neoprene, nitrile or viton.

Other

Wear appropriate chemical resistant clothing.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Recommended use: Wear respirator with dust filter.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state

Solid.

Form

Powder.

Color

White to pale yellow.

Odor	Odorless.
Odor threshold	Not available.
pH	12.5 (3% suspension/water)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Oxidizer.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Slightly soluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	527 °F (275 °C)
Viscosity	Not available.
Other information	
Bulk density	0.5 - 0.9 g/ml
Explosive limit	Non-explosive.

10. Stability and reactivity

Reactivity	Greatly increases the burning rate of combustible materials.
Chemical stability	Decomposes on heating. Product may be unstable at temperatures above: 275°C/527°F.
Possibility of hazardous reactions	Reacts slowly with water.
Conditions to avoid	Heat. Moisture. Avoid temperatures exceeding the decomposition temperature. Contact with incompatible materials.
Incompatible materials	Acids. Bases. Salts of heavy metals. Reducing agents. Combustible material.
Hazardous decomposition products	Oxygen. Hydrogen peroxide (H2O2). Steam. Heat.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Ingestion may cause irritation and malaise.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Calcium hydroxide (CAS 1305-62-0)		
Acute		
Oral		
LD50	Rat	7340 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Due to the physical form of the product it is not expected to be an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Calcium hydroxide (CAS 1305-62-0)			
Aquatic			
Fish	LC50	Zambezi barbel (Clarias gariepinus)	33.8844 mg/l, 96 hours

Persistence and degradability Decomposes in the presence of water. The product contains inorganic compounds which are not biodegradable.

Bioaccumulative potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil This substance has very low solubility in water and low mobility in the environment.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number UN1479

UN proper shipping name Oxidizing solid, n.o.s. (Calcium hydroxide oxide)

Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Label(s)	5.1
Packing group	II
Environmental hazards	
Marine pollutant	No
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	62, IB8, IP2, IP4, T3, TP33
Packaging exceptions	152
Packaging non bulk	212
Packaging bulk	240

IATA

UN number	UN1479
UN proper shipping name	Oxidizing solid, n.o.s. (Calcium hydroxide oxide)
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	No
ERG Code	5L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1479
UN proper shipping name	OXIDIZING SOLID, N.O.S. (Calcium hydroxide oxide)
Transport hazard class(es)	
Class	5.1
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-Q
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Calcium hydroxide (CAS 1305-62-0)

US. New Jersey Worker and Community Right-to-Know Act

Calcium hydroxide (CAS 1305-62-0)
Calcium hydroxide oxide (CAS 682334-66-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Calcium hydroxide (CAS 1305-62-0)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 02-April-2015

Revision date -

Version # 01

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

HMIS® ratings Health: 3
Flammability: 0
Physical hazard: 2

NFPA ratings

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.